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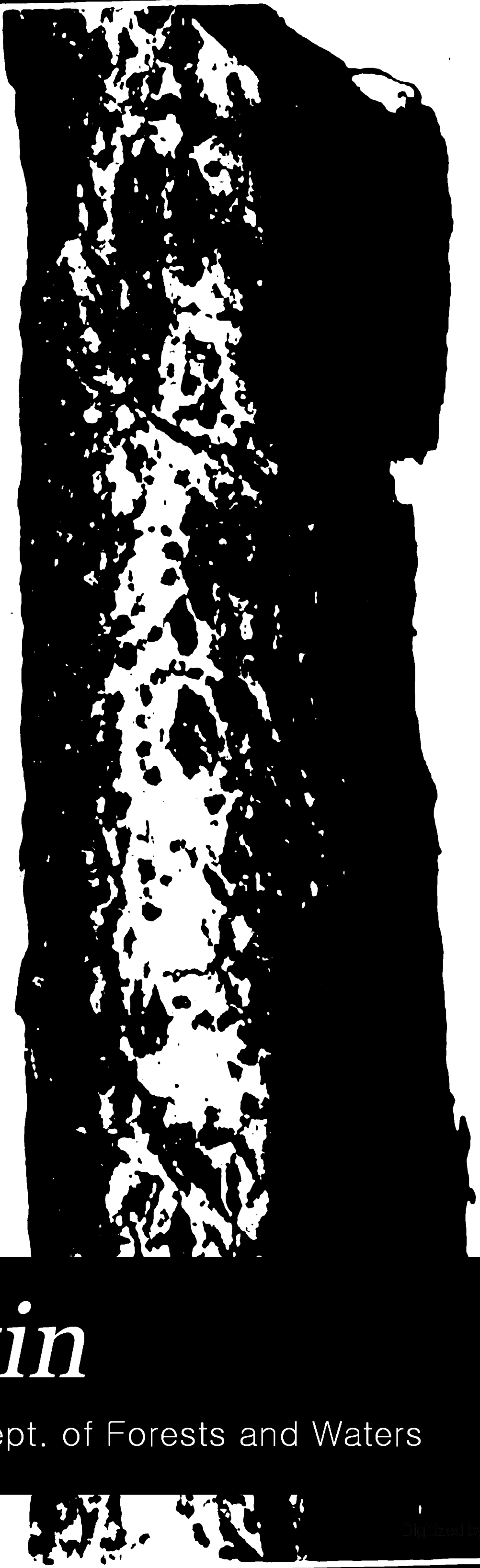

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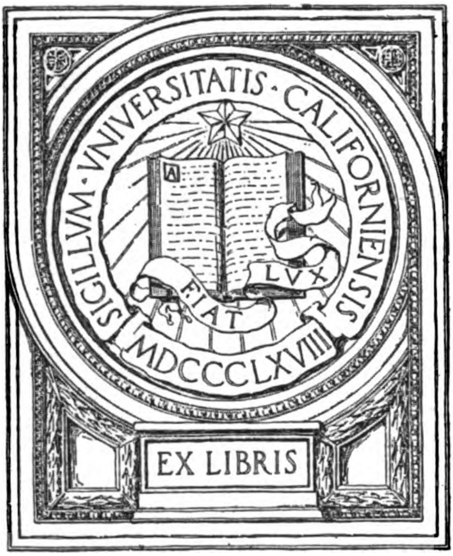

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Commonwealth of Pennsylvania

DEPARTMENT OF FORESTRY

Bulletin No. 12—April, 1915

Insects as Carriers of the Chestnut Blight Fungus

BY

R. A. STUDHALTER, Formerly Agent, Investigations in Forest
Pathology, U. S. Bureau of Plant Industry

AND

A. G. RUGGLES, Formerly Entomologist, Pennsylvania
Chestnut Tree Blight Commission

ISSUED BY DIRECTION OF THE COMMISSIONER OF FORESTRY

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INSECTS AS CARRIERS OF THE CHESTNUT BLIGHT FUNGUS[1]

HISTORICAL INTRODUCTION.

The relation which various insects bear to the dissemination of plant diseases is a subject which has received the attention of a large number of plant pathologists within recent years. In the majority of cases, however, in which insects have been held responsible for the spread of plant diseases, the evidence given in support of the accusation was quite meager and only circumstantial. In presenting a review of the literature bearing on this subject, no claim is made for completeness; it is our intention merely to point out some of the noteworthy instances in which insects have been considered responsible for the dissemination of fungi or bacteria which are saprophytic or paratitic upon plants.

Taking up first the bacterial side of the question, we find that as early as 1892 Waite (53, 54) reported definite experiments to show that the fire blight of the pear and the apple can be carried by insects. Bees, wasps, and flies were shown to carry the causal bacteria from blossom to blossom, and Waite showed that this mode of dissemination was the cause of the rapid spread of the disease in the spring. Furthermore, this author believed that the twig blight, caused by the same organism, frequently had its origin from bacteria carried by insects, although no experimental data are cited on this point. That this supposition is correct has since been proved by a number of workers. Extensive observations made by Jones (28) strongly indicated that new infections of the twigs of apples after the blossoming season were due largely to transmission by aphids, and this same author has also shown (28, 29) that the bark boring beetle, *Scolytus rugulosus*, causes large numbers of twig infections both on apple and pear trees. The spread of the blight in nursery stock has been shown by Stewart (49, 50) frequently to be due to the tarnished plant bug, *Lygus pratensis;* and while he proved many infections to be caused by aphid punctures, he does not believe that aphids play such an important part in the dissemination of the blight as was thought by Jones.

---

[1] Investigations conducted jointly by the Office of Forest Pathology, Bureau of Plant Industry, and the Pennsylvania Chestnut Tree Blight Commission.

It was early conjectured by Smith (45) and by Russell (41) that the black rot of cabbage due to *Pseudomonas campestris* may be transmitted by various insects. Evidence in support of this supposition has been brought forward by several writers; Brenner (5) showed that aphids may cause new infections, and Smith (46, pp. 306-307) succeeded in transmitting the disease by means of the larvae of a cabbage butterfly, *Plusia.*

Insects have been accused of spreading several other bacterial diseases of plants. Smith (43) cited experiments indicating that the wilt of Cucurbits due to *Bacillus tracheiphilus* may be spread by several insects. The same writer (44) also showed that the Colorado potato beetle *Leptinotarsa (Doryphora) decemlineata,* could produce new infections of *Bacillus solanacearum,* the cause of a disease of the tomato, eggplant, and Irish potato, and was led to the conclusion that insect enemies are largely responsible for the spread of the disease. Johnston (27) presents some evidence to show that the coconut bud rot may be carried by insects, and Horne, Parker, and Daines (25) suggest that the dissemination of the olive knot disease may be due to insects.

Some interesting experiments conducted by Berlese (4) show that not only are yeast cells still viable after passing through the intestine of flies, but that they even multiply and enormously increase in numbers while in the alimentary tract. His experiments lead him to the conclusion that ants and flies play a great part in the distribution, preservation, and multiplication of yeasts.

A much greater number of instances can be cited of the dissemination by insects of the spores of fungi than of bacterial diseases of plants. One of the oldest and best known examples is that of the ergot of rye. It has long been known (de Bary, 3, p. 228) that a saccharine secretion oozes out from the conidia-bearing surface. This secretion, in which the conidia are imbedded, is eagerly sought by insects, which necessarily carry away large numbers of the conidia. A large number of species of insects has been found by Stäger (47, 48) to visit ergot-infected grasses. Mercier (35) showed that the spores were not only carried mechanically on the surfaces of the bodies of insects but that they were also found in their excrement. This latter statement, however, has been questioned by Gain (13).

Insects have been shown by various writers to carry rust spores. Magnus (33) called attention to the fact that the teleutospores of various species of Diorchidium, and especially *D. steudneri,* are well adapted to insect transport on account of the fact that they are set free in dew drops, or other moisture, and are sticky. Klebahn (31) thinks that insects play a part in the local dissemination of rusts in general. This author also thinks that the bright color of some rusts may attract insects. Falck (10) suggests the probability that rust pycnospores are also distributed by insects, in the same manner as the teleutospores. Johnson (26) has made a microscopic examination of a large number of thrips found on wheat florets. A large per cent. of the thrips was found to be carrying spores; in one instance "five rust spores and three conidial spores of imperfect fungi were observed attached to the antennae and appendages of a single thrip." This writer is of the opinion that the presence of rust spores between the glumes of florets of wheat and the consequent rusting of the heads which he observed, were due in part to the activities of the thrips.

Ludwig (32, p. 369) has pointed out the close similarity between the spores of smut fungi and pollen grains. He calls attention to the fact that those smut spores which have a roughened cell wall are found on those parts of their hosts which are regularly visited by insects. Such spores very frequently develop in the anthers of insect pollinated flowers. On the other hand, the smooth walled spores are more frequently met with on those parts of plants where insects are less commonly found, or on wind pollinated plants. An analogy with the pollen grain suggested to Ludwig that the rough walled spores are disseminated by the agency of insects, and those which are smooth walled by the wind.

That the bitter rot of apples can be carried by insects was first shown by Clinton (7), who succeeded in inoculating sound apples by keeping them in a moist chamber with some bitter rot apples and some flies of the genus Drosophila. Clinton was of the belief that these flies carried the ascospores from mummied apples to green apples and were thus responsible for a large number of new infections in the spring. Burrill (6) repeated Clinton's experiments with the same positive results, and also gives more data to prove that these flies are capable of spreading the disease. He reaches the conclusion, however, that insects play only a small part in the dissemination of bitter rot in the orchard.

Another very well known example of spore distribution by insects is found in the carrion fungi. This is especially true of the common stink horn, *Phallus impudicus,* which is reported as the cause of a root disease of the grape in Hungary (Istvánffy 23, 24). Von Schlechtendal (42) was the first to recognize that the spores of this species are carried by flies, which are attracted by the foetid odor of the slimy mass in which the spores are imbedded. Of the later work on this form we may mention that of Ráthay and Haas (40) and of Fulton (12). The former pointed out the special adaptation of the sporophores for insect visitation, and that other insects besides flies visit the mature spore-bearing surfaces. Fulton found by microscopic examination, that thousands of spores cling to the feet and proboscides of the flies, and that the spores are still viable after passing through the digestive tract of flies. Cobb (8) working with a species of Ithyphallus, closely allied to *Phallus impudicus* and paratitic on sugar cane, has shown that the spores of this fungus also are widely disseminated by flies and other insects. The number of spores per foot print of a fly may be as high as 860,000, and it was shown that these were capable of germinating. Five fly specks contained on an average of 22,400,000 spores, many of which were viable.

Heald (15) has established an intimate relation between the bud rot of carnations and certain mites. These develop in the mass of rotted petals, and the young migrate to healthy buds. carrying the spores of the causal fungus with them.

Massee (34, p. 184) has pointed out that the rapid spread of apple canker in England due to *Nectria ditissima,* coincided with the introduction of the American blight, or woolly aphis. He is of the opinion that the canker would not have been present in an epidemic form had the insect not been introduced into England.

Grossenbacher and Dugger (14) have pointed out that the blight of currants due to *Botryosphaeria ribis* may be carried by several insects, the most likely of which is the American currant borer, *Psenocerus supernotatus.* This insect was not found in blight-free plantations. The authors conclude that "since the imago eats the fungus and the larva lives as a borer in the host, the beetle's habit of oviposition may have some relation to the dissemination of the fungus and the inoculation of the host."

The statement is made by Jones, Giddings, and Lutman (30) that leaf eating insects function in the distribution of the spores of the potato fungus, *Phytophthora infestans.* A related fungus, *P. phaseoli,* a mildew on the lima bean, is believed by Sturgis (52) to be spread by bees. This is based on observations in the field and on a study of the structure of the flower and pod of the lima bean.

The sooty mold of the orange and other citrous fruits, due to *Meliola camelliae,* follows the attacks of certain scales and aphid-like insects. In Florida (Webber, 55) the trouble becomes serious when it follows infestations of the white fly, *Aleyrodes citri,* and the fungus derives its nourishment from the honey dew secreted by this insect. The amount of sooty mold depends directly on the amount of honey dew present, or upon the distribution of the white fly, which, furthermore, acts as an agent in transmitting the spores of the fungus.

The mosaic disease of tobacco has generally been considered a physiological trouble. Allard (1) expresses the opinion, however, that paratitism offers the more plausible explanation of the ultimate cause of the disease. The observations of this author indicate that aphids may sometimes be responsible for the occurrence of the trouble in the seed bed and its subsequent spread in the field. He has succeeded in keeping the disease under complete control in the greenhouse by frequent fumigations to exclude aphids.

In some of the instances cited the conclusion that insects play a part in the dissemination of these organisms was based merely upon circumstantial evidence. However, in a sufficient number of them enough substantial experimental evidence was presented to point to the importance of insects as carriers of fungous spores and of bacteria parasitic upon plants.

We may next consider the literature bearing upon the relation of insects to the spread of the chestnut blight, or bark disease, caused by the fungus, *Endothia parasitica* (Murr.) A. and A. From the very beginning of the study of this disease insects have received a good share of the blame for its spread. In 1906 Murrill (38) stated that from the numerous yellowish-brown pustules produced by the blight, "millions of minute summer spores emerge from day to day in elongated reddish-brown masses, to be disseminated by the wind and other agencies, such as insects, birds, squirrels, etc." Later in the same publication he added that "every bird and insect that rests upon an infected spot is liable to carry the spores upon its feet or body to other trees."

Several years later Hodson (22) said that "the spores are no doubt carried by animals, birds, insects, and by the shipment of infected material," The statement is made by Metcalf and Collins (37) that "there is strong evidence that the spores are spread extensively by birds, especially woodpeckers, and there is also excellent evidence that they are spread by insects and by various rodents, such as squirrels." An essentially similar statement was made the following year by Metcalf (36).

In discussing the methods by which conidia are transported from one tree to another, Rankin (39) makes the following statement: "Reasoning by analogy with what is known of the behavior of many fungi, such agencies as borers, birds, ants and the wind, etc., have been suggested but in no wise proved to be responsible."

Fulton (11) reports that a detailed study of a spot infection at Orbisonia, Pa., by Mr. R. C. Walton showed beetle larvae in or near fully nine-tenths of the old lesions, and about two-fifths of the youngest lesions. He concludes, therefore, that the larvae usually follow rather than precede the infection. Various other writers have noted this evident relation between chestnut blight cankers and the holes and tunnels of wood borers, and this is no doubt one of the reasons that insects have been so frequently suggested as carriers of spores. Anderson and Babcock (2) call attention to the fact that probably all of the larvae living in chestnut trees emerge either as adults, leaving the pupal case behind them, or else go into the ground to pupate immediately after emerging; in either case they would have very little opportunity of carrying spores from one tree to another.

Ants have also frequently been found in old blight lesions (11, 39), and have therefore been rather extensively accused of spreading the blight spores and causing infections. Anderson and Babcock (2) have carried out a number of experiments with ants taken from blight cankers. In one of these the ants were permitted to run over potato agar plates, but no colonies of *Endothia parasitica* developed. The experiment was repeated by Mr. R. D. Spencer, under Mr. Anderson's supervision, with the same negative results. We agree with Mr. Spencer (2) that the method is very likely at fault, for the comparatively slow-growing colonies of the blight fungus would soon be crowded out and overrun by other more rapid-growing fungi or bacteria. A more satisfactory method was employed in the next experiment reported by Anderson and Babcock, in which five vials of ants were placed into melted agar, which was just warm enough so that is would not solidify. The tubes were well shaken and the agar poured into Petri dishes. "Ants from three of the vials proved to have spores on them. The spores had been artificially placed on the ants in one of the vials, however. The ants in the other two had been taken from the bark of the diseased chestnut trees after a rain. This indicates that the ants can carry the spores." It would be interesting to know the actual number of spores carried in these instances.

In another experiment ants, which had been previously placed in water milky with conidia, were allowed to run in a bottle of earth. Two of these were taken out at intervals and tested in the same manner as was described in the experiment just preceding. Positive results were obtained for five hours and sixteen minutes after placing the ants into the bottle, at which time the last test was made. The authors are led to the conclusion that "this shows that ants may retain the spores long enough to carry them some distance." Here again it would be interesting to have the quantitative results and to know whether the number of spores diminished gradually from the first to the last test.

There are a number of insects known to eat the pustules of the chestnut blight fungus (9), but the most common of these in Pennsylvania is the beetle, *Leptostylus macula* Say. In order to determine whether this habit of eating the spores is beneficial, the following tests have been reported (2 and 9): A number of the beetles were fed on pustles for five days, after which their viscera were removed with sterile needles, put into melted potato agar and plated out. Bacteria developed in the plates but no fungous colonies were obtained. Other beetles of this species were fed on ascosporic stromata for a day and "caused to excrete the fecal material by a light pressure on the abdomen with the forceps. The fecal material was caught in potato agar tubes and plated out with the same negative results as in the preceding experiment. These experiments indicate that the insect may really be beneficial," (2) since the spores are not passed out in the excreta to germinate on other hosts. The present writers agree that this beetle is beneficial in so far as it destroys the spores and pustules, but the point seems to have been overlooked that a beetle of this habit has excellent opportunities for collecting and carrying away a large number of spores on its feet and body, and that new infections may be caused as a result of the rattling off of these spores.

The writers above referred to (2) came to the general conclusion that "insects are not important agents in the spread of the blight, except in so far as they produce wounds by which the spores may enter."

There has been much conjecture as to the part played by the bast miner, *Ectoedemia phleophaga*, an insect which is very abundant on the chestnut. The adult of this insect is an extremely small Micro-Lepidopterous form which, judging from its life history, cannot in our opinion cause new infections directly. It is of great importance, however, from the fact that the large number of openings which this form makes in the bark of the chestnut serve as points in which new infections may start from spores introduced by other means than by the bast miner.

METHOD.

The authors wish to express their appreciation for the many helpful suggestions and criticism of Dr. F. D. Heald, under whose supervision the work was carried out. Credit is also due to Prof. W. M. Wheeler of Harvard University for the determination of all the ants herein reported.

The insects used in these tests were for the most part collected in the field, but some of them were ants used in certain laboratory and insectary tests. Those brought in from the field were collected at four different points in Pennsylvania,—West Chester, Valley Forge, Lehighton, and Fairmount Park, Philadelphia. All but three of these insects (Nos. 69-71) were picked directly from chestnut blight cankers with sterile forceps, and dropped into sterile tubes plugged with cotton. In some instances use was made of cyanide tubes, also plugged with cotton and sterilized in the autoclave. It had been previously determined that the potassium cyanide has no appreciable effect on spores of the blight fungus (16).

When brought to the laboratory each insect was dropped into a flask containing 100 cc. of sterile tap water. The flask was shaken at intervals and the insects were always permitted to remain in the water for at least several hours before the plate cultures were made, or, in many instances in which they were brought to the laboratory in the late afternoon or evening, they were kept in the flasks all night, thus affording sufficient opportunity for the spores to become loosened from their feet and body. By means of a sterile pipette small quantities of this wash water were transferred to Petri dishes and a tube of melted 3% dextrose agar (+10), which had been previously cooled to 42-45°C., added to each plate. The quantities of wash water found the most satisfactory and used in nearly all cases were 1 cc., 10 drops and 5 drops to each Petri dish, although in a few instances it was thought advisable to add to these a greater dilution, and 1 cc. from a second flask (containing 1 cc. of wash water in 100 cc.) was used. A record was kept of the number of drops delivered by each pipette, and this was found to be fairly constant for any single pipette, although it varied considerably for the different ones used.

The plates were incubated in the laboratory, the temperature of which was kept approximately at 25° C. Colonies suspected of being the blight fungus were marked on the fourth day with India ink, and the counts were verified two or three days later, at which time any doubtful colonies were transferred to agar slants to make certain of their identity. A count was also made of the number of bacterial or yeast colonies, the number of fungous colonies not *Endothia parasitica,* and the number of species of fungi represented other than the blight fungus, as nearly as could be determined from cultural characteristics. Knowing the calibration of the pipette used, it was an easy matter to compute from the above information the number of viable spores of the blight fungus, the number of spores of other fungi and the number of bacteria and yeasts carried by each insect.

Those insects which had been used in the laboratory and insectary tests were collected and cultures made from them in essentially the same way as those brought in from the field, except that no record was kept of the number of fungous species represented in the cultures.

After the plates had been poured, the insects were preserved for classification, and beginning with insect No. 34, a few cc. of formalin were added to the wash water to inhibit the growth of spores. At a later time the wash water from those insects yielding positive results was centrifuged in 10 cc. quantities and the sediments thus obtained thrown together and centrifuged again. All but a small quantity of water at the bottom of the centrifuge tube was then carefully drawn off with a pipette, thus concentrating the entire sediment in 1 cc. or less of water. This sediment was given a thorough microscopic examination, primarily to determine whether the spores of the blight fungus present were pycnospores or ascospores, but also to get an idea of the other kinds of spores which the insects were carrying.

RESULTS OBTAINED FROM THE CULTURES.

As has already been stated, insects Nos. 1-18 and 23-25 were taken from certain experiments carried on in the laboratory and insectary at Philadelphia. All of these were red ants belonging to the same species (Table I). Before being tested Nos. 1-3 and 10-18 were permitted to run over pieces of moistened chestnut bark bearing active perithecia, while Nos. 4-9 had run over bark bearing spore horns.

Of these 21 ants, 5 yielded positive results, two of them carrying 2,733 and 4,000 spores of *Endothia parasitica* respectively (Table I). Only one of these five had had access to pycnidial material, while the other four had been on and about bark bearing active perithecia.

TABLE I.—RESULTS OBTAINED FROM CULTURES.

Number.	Name of Insect.	Date of collection, 1918.	Locality at which collected (Penna.)	No. of bacterial and yeast colonies.	No. of *Endothia parasitica* colonies.	No. of other fungous colonies.	No. of fungous species not *Endothia parasitica*.
1	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	Feb. 7	Laboratory,	Present	866	?	....
2	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	Feb. 7	Laboratory,	Present	2783	?	....
3	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	Feb. 7	Laboratory,	?	4000	?	....
4	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nly.,	Mar. 11	Insectary,	300	0	1800	....
5	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	Mar. 11	Insectary,	400	0	400	....
6	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	Mar. 11	Insectary,	300	0	3000	....
7	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	Mar. 14	Insectary,	2450	0	500	....
8	Ant, *Formica rufa*, Linn. Subsp. *integra*, *Nyl.*,	Mar. 14	Insectary,	18400	0	200	....
9	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	Mar. 14	Insectary,	11	0	9000	....
10	Ant, *Formica rufa*, Linn. Subsp. *integra* Nyl.,	April 4	Insectary,	1850	0	1252	....
11	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 4	Insectary,	686	838	1904	....
12	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 4	Insectary,	10080	0	400	....
13	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 8	Insectary,	218	0	218	....
14	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 8	Insectary,	291	0	145	....
15	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 8	Insectary,	73	0	363	....
16	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 18	Insectary,	296	0	148	....
17	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 18	Insectary,	825	0	375	....
18	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	April 18	Insectary,	9158	0	3768	....
19	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	May 19	West Chester,	147	0	1988	....
20	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	May 19	West Chester,	0	0	158	....
21	Ant, *Formica rufa* Linn. Subsp. *integra*, Nyl.,	May 19	West Chester,	0	0	0	....
22	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	May 19	West Chester,	68577	74	0	....
23	Ant, *Formica rufa*, Linn. Subsp. *interga*, Nyl.,	May 21	Insectary,	0	0	605	....
24	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	May 21	Insectary,	280	1400	700	....
25	Ant, *Formica rufa*, Linn. Subsp. *integra*, Nyl.,	May 21	Insectary,	1680	0	560	....
26	Fly, Trypetid,	May 19	West Chester,	0	0	?	....
27	Fly, Trypetid,	May 19	West Chester,	0	1061	133	....
28	Fly, Trypetid,	May 19	West Chester,	0	0	671	....
29	Ant, *Leptothorax curvispinosus* Mayi,	June 3	Valley Forge,	840	0	840	1
30	Beetle, *Leptostylus macula* Say,	June 3	Valley Forge,	0	336960	960	2
31	Ant, *Leptothorax curvispinosus* Mayi,	June 3	Valley Forge,	880	0	0	0

32	Ant, *Formica fusca* L. var. *subsericea* Say, ...	June	3	Valley Forge, ...	0	0	0	0
33	Nymph of a Heteropteron, ...	June	3	Valley Forge, ...	0	0	840	1
34	Nymph of a tree hopper, ...	June	5	Lehighton, ...	0	0	587	2
35	Nymph of a tree hopper, ...	June	5	Lehighton, ...	229	0	305	4
36	Nymph of a tree hopper, ...	June	5	Lehighton, ...	100	249	300	3
37	Nymph of a tree hopper, ...	June	5	Lehighton, ...	100	0	1212	3
38	Crane fly, Tipula sp., ...	June	5	Lehighton, ...	Numerous	0	2438	2
39	Canker worm larva, *Tornos scolopacinarius* Guen,	June	5	Lehighton, ...	361	0	451	4
40	Ant, *Camponotus herculeanus pennsylvanicus* De Greer var. *ferrugineus* Fabr.	June	12	West Chester, ...	300	0	300	2
41	Ant, *Camponotus herculeanus pennsylvanicus* De Greer var. *ferrugineus* Fabr.	June	12	West Chester, ...	0	0	0	0
42	Ant, *Camponotus herculeanus pennsylvanicus* De Greer var. *ferrugineus* Fabr.	June	12	West Chester, ...	840	0	242	3
43	Beetle, Rhynchites sp., ...	June	12	West Chester, ...	23086	0	1087	5
44	Beetle, *Leptostylus macula* Say, ...	June	12	West Chester, ...	0	145840	0	0
45	Beetle, *Helops micans* Fab., ...	June	12	West Chester, ...	9896	6715	247	2
46	Ant, *Formica fusca* L. var. *subsericea* Say, ...	June	12	West Chester, ...	0	0	0	0
47	Ant, *Camponotus herculeanus pennsylvanicus* De Greer var. *ferrugineus* Fabr.	June	13	Valley Forge, ...	547	168	2080	2
48	Aphid, Lachnus, ...	June	13	Valley Forge, ...	0	100	0	0
49	Beetle, Cerambycidae, ...	June	13	Valley Forge, ...	1566	0	880	1
50	Beetle, *Helops micans* Fab., ...	June	13	Valley Forge, ...	116100	0	982	2
51	Beetle, *Meracantha contracta* Beauv., ...	June	13	Valley Forge, ...	1000	462	692	3
52	Ant, *Camponotus herculeanus pennsylvanicus* De Greer var. *ferrugineus* Fabr.	June	13	Valley Forge, ...	34200	0	1400	1
53	Aphid, Lachnus sp., ...	June	13	Valley Forge, ...	18263	151	943	4
54	Beetle, *Helops micans* Fab., ...	June	13	Valley Forge, ...	30720	4792	634	3
55	Spider, Phalangium sp., ...	June	13	Valley Forge, ...	2640	0	746	3
56	Beetle, *Arthromacra aenea* Say, ...	June	13	Valley Forge, ...	12880	0	2746	4
57	Spider, Phalangium sp., ...	June	13	Valley Forge, ...	390	0	650	6
58	Beetle, *Coccinella novemnotata* Herbst, ...	June	16	Fairmount Park, Philadelphia,	0	0	180	1
59	Beetle, *Coccinella novemnotata* Herbst, ...	June	16	Fairmount Park, Philadelphia,	0	0	1561	5
60	Ant, *Formica fusca* L. var. *subsericea* Say, ...	June	16	Fairmount Park, Philadelphia,	0	0	0	0
61	Ant, *Formica fusca* L. var. *subsericea* Say, ...	June	16	Fairmount Park, Philadelphia,	0	0	0	0
62	Ant, *Formica fusca* L. var. *subsericea* Say, ...	June	16	Fairmount Park, Philadelphia,	0	0	0	0
63	Beetle, *Leptostylus macula* Say, ...	June	19	West Chester, ...	100	200	409	2
64	Beetle, *Leptostylus macula* Say, ...	June	19	West Chester, ...	0	8538	4615	2
65	Beetle, *Leptostylus macula* Say, ...	June	19	West Chester, ...	0	100	269	2
66	Beetle, *Leptostylus macula* Say, ...	June	19	West Chester, ...	0	1098	446	3
67	Beetle, *Leptostylus macula* Say, ...	June	19	West Chester, ...	0	100	394	7
68	Beetle, *Leptostylus macula* Say, ...	June	19	West Chester, ...	0	500	200	2
69	Robber fly, Asilus sp., ...	June	19	West Chester, ...	180	0	2400	3
70	Crane fly, Tipula sp., ...	June	19	West Chester, ...	1230	0	357	2
71	Beetle, *Cystela sericea* Forst, ...	June	19	West Chester, ...	1680	840	2800	1
72	Ant, *Formica fusca* L. var. *subsericea* Say, ...	June	19	West Chester, ...	860	0	1720	2
73	Moth, Micro-lepidopteron, ...	June	19	West Chester, ...	1000	0	0	0
74	Beetle, *Arthromacra aenea* Say, ...	June	19	West Chester, ...	Present	0	0	0
75	Ant, *Formica fusca* L. var. *subsericea* Say, ...	June	19	West Chester, ...	860	300	1433	4

All of the remaining insects were brought to the laboratory from four different points in the field. In all 52 insects were thus brought in, and in addition tests were made of two spiders. Five orders of insects were represented (Table II), and positive results were obtained from insects in all of these except the Lepidoptera, of which only two members were tested. Of the 52 insects from the field 19 were found to be carrying spores of the blight fungus, but both of the spiders yielded negative results. The number of viable spores of *Endothia parasitica* per insect ranged from 74 to 336,960, and five yielded over 4,000 spores each. An abstract of these results has already been published (51).

Reference has been made in the introduction to *Leptostylus macula,* one of the beetles which feeds on pustules of the blight fungus (Figs. 1 and 2). Only eight of these beetles were tested, but all of them yielded positive results. It will be noted that of all the insects tested, the three which yielded the highest numbers of spores of the blight fungus belonged to this species of beetle. A photograph was made of the plate cultures from one of these, insect No. 30, after 6 days of growth, and this is represented in Fig. 3.

On the strength of these results we cannot agree with the conclusions drawn by Craighead (9) and by Anderson and Babcock (2), for the large numbers of spores carried by this beetle certainly indicate that it may be an important agent in the dissemination of the blight fungus.

It has been shown by Anderson and Babcock (see p. 14) that spores will stick to the bodies of ants during their normal movements in a bottle of earth for at least five hours. In our tests most of the insects were brought in from the field in glass tubes. Those from West Chester and Valley Forge were kept in these tubes for at least two hours before they were transferred to flasks of water, and those from Lehighton for a much longer time. The fact that positive results were obtained from many of these bears out the results of the above mentioned writers.

In this connection, however, it might be asked whether the spores might not stick to the feet and body of the insects to such an extent that they would not be brushed off during any

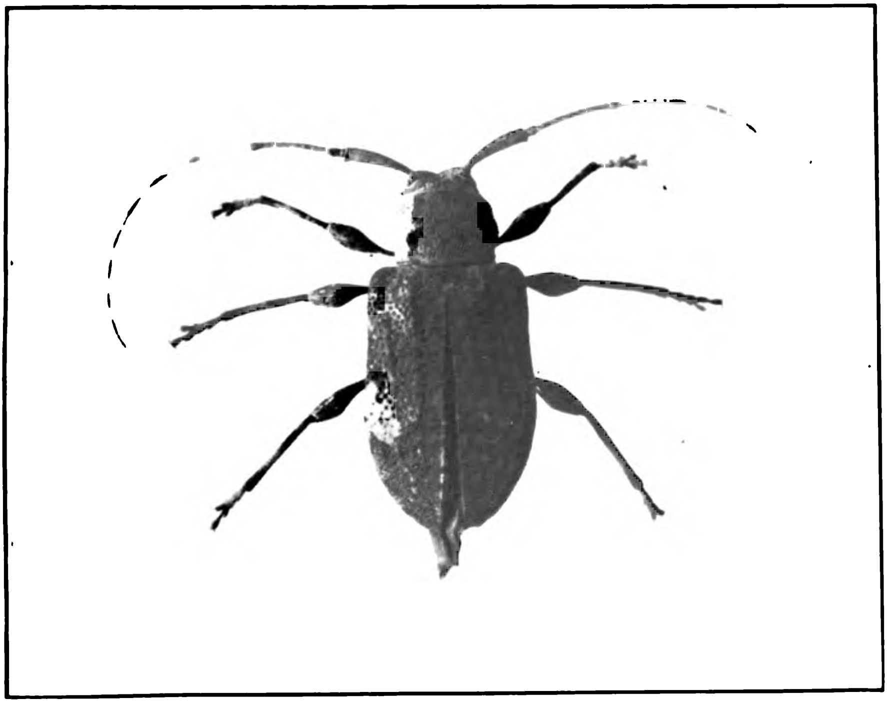


Fig. 1.

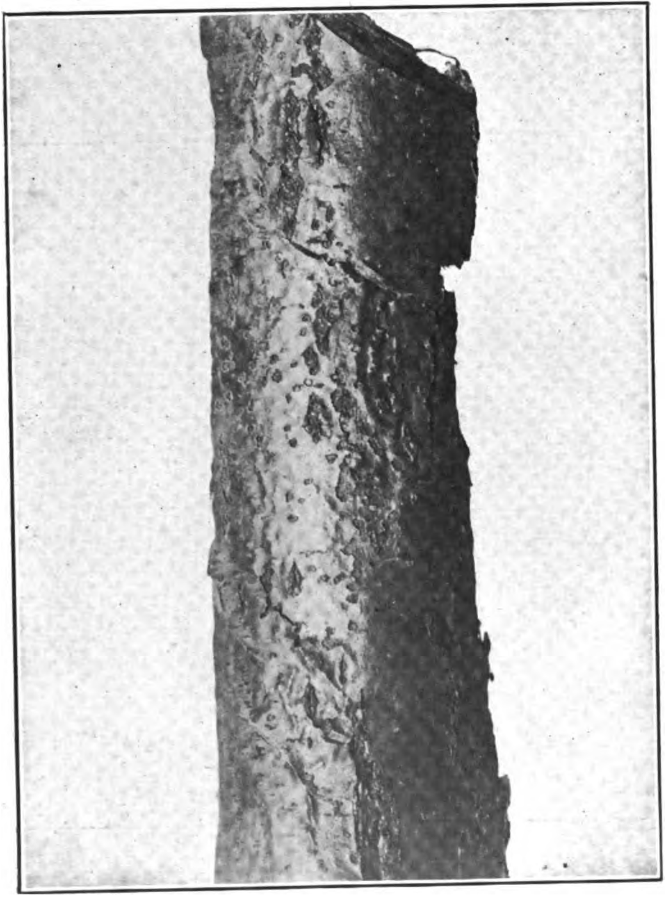


Fig. 2.

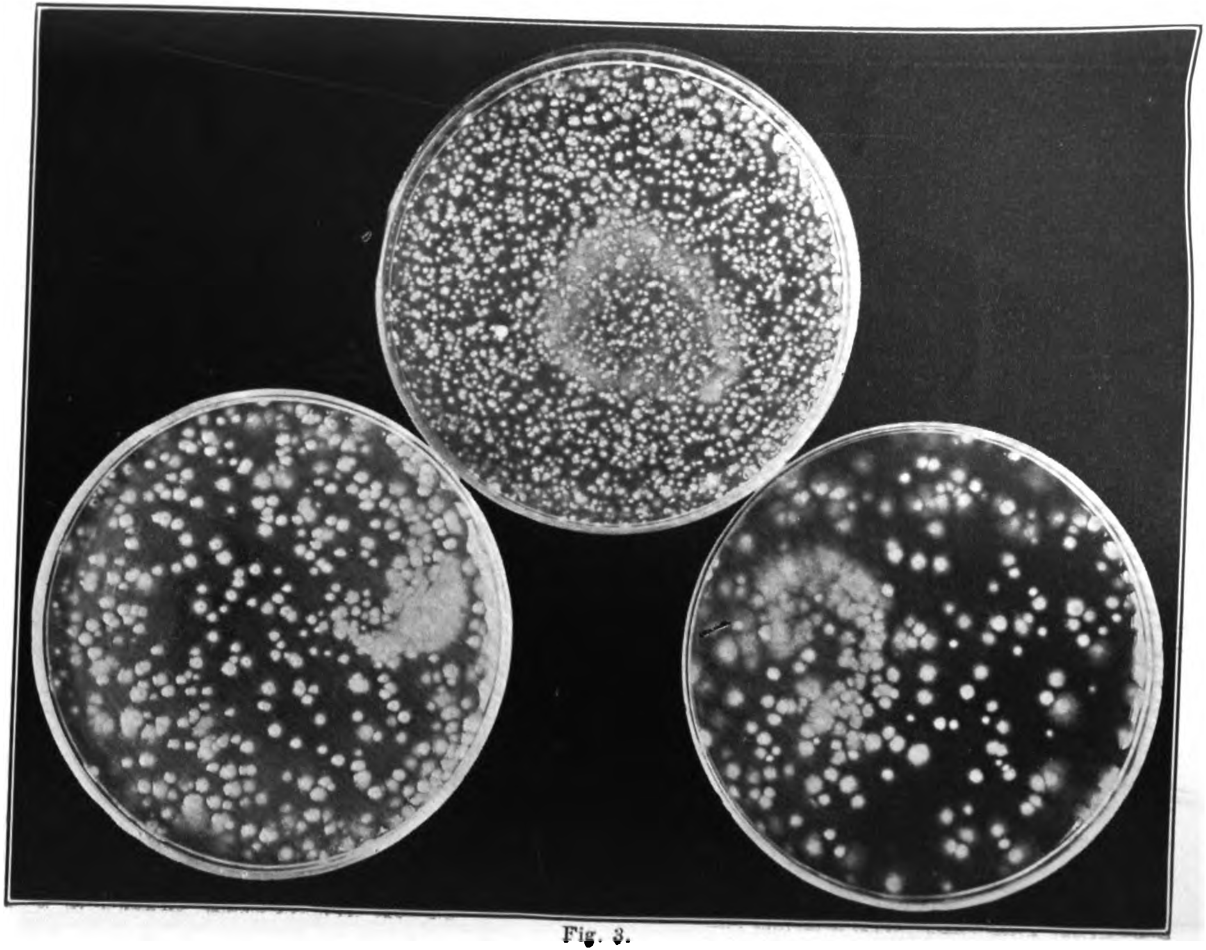
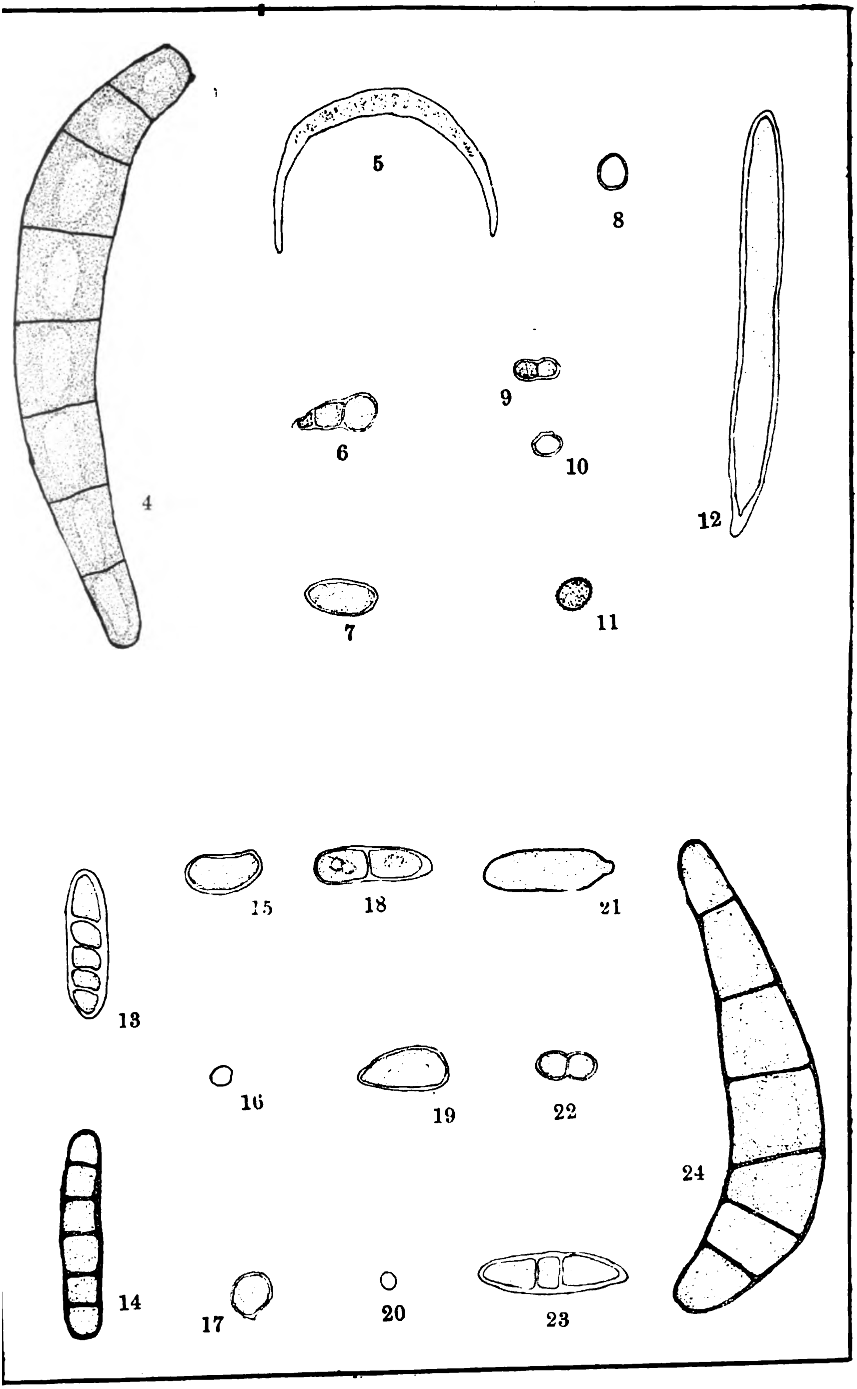


Fig. 3.



Figs. 4-24.

normal movements on the part of the insect. In order to get some evidence on this point plate cultures were made from the glass tubes in which insects Nos. 63, 64, and 65 were confined during transit from the field. These three insects were *Leptostylus macula,* taken at West Chester in the afternoon of June 19. After they had been in the glass tubes for about two hours, they were taken out and transferred to flasks of water. On the following day 1 or 2 cc. of sterile water was poured into each tube, which was shaken vigorously, and the water then emptied into a Petri dish and agar poured over it. It will be noticed from the results obtained (Table III) that a fair percentage of the spores originally adhering to the beetles had been shaken from their bodies by their movements within the glass tubes.

The time of development of the colonies of the blight fungus in the cultures indicated that almost all of them originated from pycnospores (17), but a very few of them plainly had their origin from ascospores. The colonies obtained in the plates from insects Nos. 1, 2, 3, and 22, however, started from ascospores, but this is to be expected from the fact that these insects had had access to ascosporic material only.

TABLE II.

SUMMARY OF RESULTS OBTAINED FROM CULTURES.

Kinds of Insects.	Number tested.	Number yielding positive results.	Largest No. of *Endothia parasitica* colonies per single insect.
Hemiptera,	7	3	249
Coleoptera:			
Leptostylus macula,	8	8	336,960
All other beetles,	11	4	6,715
Lepidoptera,	2	0	....
Diptera,	6	1	1,051
Hymenoptera:			
Ants from the field,	18	3	300
Ants from laboratory and insectary,	21	5	4,000
Spiders,	2	0	....
Grand total,	75	24	....
Minus ants from laboratory and insectary,	21	5	....
Total insects and spiders from the field,	54	19	....

TABLE III.

NUMBER OF *Endothia parasitica* SPORES DISLODGED FROM THE FEET AND BODY OF *Leptostylus macula* BY ITS OWN MOVEMENTS.

Insect number.	No. of *Endothia parasitica* spores obtained in the cultures.	No. of *Endothia parasitica* spores obtained from the vials.
63	200	11
64	8,533	85
65	100	3

A comparison of the results from the insects with those from birds tested in a somewhat similar manner(21) shows that the birds carried a larger number of spores of the blight fungus. But it must be remembered that the surface area of the body of the insects is but a small fraction of that of the parts of the birds tested—the head, bill, feet, wing, and tail feathers,—and these latter also offer better opportunities for the lodgment of spores than the smoother bodies of many insects, such as ants. The maximum number of spores of the blight fungus obtained from a single bird was 757,074 not much more than twice the maximum, 336,960, obtained from a single insect. In proportion to size, therefore, insects may carry a much larger number of spores of *Endothia parasitica* than birds. Although the insects probably do not carry the spores to as great distances as birds, especially migratory birds, they can nevertheless carry large enough numbers of spores to be important agents in spreading the blight locally.

In the work on birds as carriers (21) it was found that the highest numbers of spores of the blight fungus were obtained two to four days after a rain, and that the birds were carrying pycnospores only. Not a sufficient number of collections of insects was made to get any definite relation of the number of spores carried to rain periods. It may be stated, however, that nearly all of the insects brought in from the field were taken four days or more after a rain, for May and June, 1913, were rather dry months. Since the insects were carrying pycnospores almost exclusively we believe that they too will be found to carry a larger number of spores of *Endothia parasitica* shortly after rain periods than at other times. It is a noteworthy fact that insects Nos. 63 to 68, all *Leptostylus macula,* and all yielding positive results, were taken at West Chester twelve days after a rain.

The large numbers of spores carried by *L. macula* is no doubt explained by the fact that many spores must necessarily adhere to the body of this beetle while it is eating pustules of the blight fungus. It would be expected that this beetle would carry both pycnospores and ascospores, and such was the case, although the latter were very rare. The other insects also were carrying pycnospores almost exclusively. These pycnospores we believe were obtained for the most part by brushing them off during the normal movements of the insects over diseased and healthy bark, in the same manner in which the birds obtained the pycnospores (21). The reasons for this belief may be summarized as follows:

1. Ascospores are carried away by the wind upon being expelled from the perithecia (2 and 20).
2. Pycnospores are washed down the trunks of trees in great numbers by the rains, even during the winter months, while ascospores are not washed down (18).
3. Viable pycnospores can be obtained in abundance from healthy bark below lesions (51a).
4. We do not believe that the pycnospores were obtained directly from spore horns, because these become hard when dry and spores are not easily brushed from them. This conclusion is substantiated by the fact that only one of the nine insects which had been permitted to run over spore horn material in the insectary yielded positive results.

There is another possible source for some of the pycnospores carried. It is known that pycnospores are washed into the soil around the bases of infected trees, and these have been found to remain viable for a period of two to thirteen days of dry weather (19). It is quite likely that some of the insects, especially the ants, may have obtained considerable numbers of pycnospores from this source.

All told, the insects have very much more opportunity of obtaining pycnospores than ascospores, and it is not surprising that only a very few of the colonies of the chestnut blight fungus developing in the cultures originated from ascospores (17).

MICROSCOPIC EXAMINATION OF CENTRIFUGED SEDIMENTS.

It has already been stated that, beginning with insect No. 34, the original wash water of those insects yielding positive results was centrifuged and given a thorough microscopic examination. The sediment had been concentrated in a very small quantity of water, and the entire sediment was generally examined.

The purpose of the examination was primarily to ascertain whether the spores of *Endothia parasitica* carried were pycnospores or ascospores, this to serve as a check on the observations based on the rapidity of development of the colonies in cultures. It was possible to find pycnospores in the sediment from every insect which had yielded positive results in the cultures. Where these results were high, pycnospores were found very easily, but where the cultures indicated that only a few spores of the blight fungus were carried, they were located with greater difficulty, but could always be found after a reasonable search. The results of these examinations are presented in Table IV. It should be stated that the sediments were free from dirt particles, and that the pycnospores were therefore much easier to find than in the sediments from the birds (21), for a considerable amount of dirt was added to the bird sediments as a result of scrubbing the feet, bill, tail, and wing feathers.

Ascospores were found to be present in the sediments from only five insects, three of which were *Leptostylus macula.* It would seem reasonable to suppose that this insect would carry a considerable number of ascospores on account of its habit of eating the pustules, but such was not the case, for the number of ascospores found in the sediments was only a small fraction of the number of pycnospores present. A probable explanation is that ascospores are not as sticky as pycnospores, and would therefore not adhere so well to the body of the beetle. It is possible that the insects would have carried a larger number of ascospores had they been taken just after a rain, for four of the twelve insects which had run over active perithecia in the laboratory and insectary yielded positive results. This possibility, however, will appear less likely when we reason by analogy with the results obtained from the birds (21), for not a single ascospore was found in the sediments from the 19 birds yielding positive results, although many of them had been shot just after rains.

TABLE IV.

RESULTS OF MICROSCOPIC EXAMINATION OF CENTRIFUGED SEDIMENTS.

Insect numbers.	No. of spores of blight fungus carried as shown by cultures.	Kind of spores as shown by microscopic examination of sediments.
1-33	....	Sediment not retained.
34-35	0	Examination not necessary.
36	249	Pycnospores present; no ascospores.
44	146,340	*Pycnospores very abundant; 9 ascospores.*
45	6,715	*Pycnospores abundant; 3 ascospores*
46	0	Examination not necessary.
47	168	Pycnospores present; no ascospores.
48	100	Pycnospores present; no ascospores.
49-50	0	Examination not necessary.
51	462	Pycnospores present; no ascospores.
52	0	Examination not necessary.
53	151	Pycnospores present; no ascospores.
54	4,792	Pycnospores easily found; no ascospores.
55-62	0	Examination not necessary.
63	200	Pycnospores present; no ascospores.
64	8,588	*Pycnospores abundant; 2 ascospores.*
65	100	Pycnospores present; no ascospores.
66	1,098	Pycnospores present; no ascospores.
67	100	Pycnospores present; no ascospores.
68	500	Pycnospores present; 1 *ascospore*
69-70	0	Examination not necessary.
71	840	Pycnospores present; 2 *ascospores.*
72-74	0	Examination not necessary.
75	900	Pycnospores present; no ascospores.

SPORES OF OTHER FUNGI CARRIED BY THE INSECTS.

The results obtained in the cultures show that 10 of the 19 insects brought in from the field and yielding positive results carried a larger number of spores of the blight fungus than of all other fungi combined, and three of these (Nos. 22, 44, and 48) were not carrying any other fungous spores. In addition, insect No. 30, which yielded the highest positive results obtained (Fig. 3), gave almost pure cultures of the chestnut blight fungus.

The number of species of fungi other than *Endothia parasitica* represented in the cultures varied from 0 to 7 per insect, and those which appeared most frequently were species of Penicillium and Cladosporium. Little attempt was made to identify those species less frequently met with, especially if they did not fruit in culture.

As was the case in the work on the birds, the microscopic examination of the centrifuged sediments revealed the fact that a larger number of species of fungi was carried by at least some insects than was indicated in the cultures. The determination of the number of species carried was based upon the cultures and on the microscopic examination of the centrifuged sediments. In the latter the size, form, septation, and coloration of the spores were taken into consideration. One form in particular was frequently found in the sediments, which never appeared in the cultures, probably on account of its slow growth. This was a species of Coryneum. It is our opinion that the number of fungous spores carried was very likely greater in every case than was shown by the cultures (Table I).

The fungous spores, other than those of the blight fungus, found in the sediment from insects Nos. 44 and 64 are represented in Figs. 4-24. In the sediment from the latter insect, 10 different kinds of spores were found, while only 2 species of fungi other than the blight fungus appeared in the cultures. In the former the numbers were 7 and 0 respectively.

SUMMARY AND CONCLUSIONS.

1. Each insect tested was placed in a flask containing 100 cc. of sterile water, kept there for at least several hours, small quantities of the water plated out in dilution plates, and the wash water centrifuged in case positive results were obtained.

2. Tests were made of 21 ants used in certain laboratory and insectary experiments in which they had been permitted to run over chestnut bark bearing spore horns or active perithecial pustules of the chestnut blight fungus, *Endothia parasitica.*

3. Five of these 21 ants were found to be carrying spores of the chestnut blight fungus.

4. Tests were also made of 52 insects and 2 spiders brought in from the field. All but three of these were picked directly from the chestnut blight cankers.

5. Both of the spiders yielded negative results, while 19 of the 52 insects from the field were found to be carrying spores of *Endothia parasitica.*

6. Positive results were obtained from insects in the orders Hemiptera, Coleoptera, Diptera, and Hymenoptera. The only other order of insects represented was the Lepidoptera, of which only two individuals were tested, both with negative results.

7. The number of viable spores of the blight fungus carried varied from 74 to 336,960 per insect.

8. The cultures from three insects contained no fungous colonies except those of *Endothia parasitica.*

9. Each of the eight individuals tested of *Leptostylus macula,* one of the beetles which feeds on pustules of the blight fungus, yielded positive results.

10. The three highest positive results obtained, 336,960, 145,340 and 8,538, were from *Leptostylus macula.*

11. It was demonstrated that the spores of the blight fungus were easily shaken from the body of this beetle by its own movements.

12. From the rate of development of the colonies of *Endothia parasitica* in cultures, it was determined that the insects from the field were carrying pycnospores almost exclusively.

13. A microscopic examination of the centrifuged sediments showed a very few ascospores, and these from only five insects. Pycnospores were present in the sediment from every insect yielding positive results.

14. The insects tested, even *Leptostylus macula,* which eats the pustules, were therefore carrying pycnospores almost exclusively.

15. Most of the pycnospores were probably brushed off from normal or diseased bark, or both, by the movements of the insects over these surfaces. Some were probably obtained while eating the pustules, and some may have been obtained from the soil around the bases of diseased trees.

16. Most of the insects were also carrying spores of fungi other than *Endothia parasitica.* The number of species of other fungi varied from 0 to 7 in the cultures, but was shown by microscopic examination of the centrifuged sediments to be greater in at least some cases.

17. In proportion to size, insects may carry a greater number of spores of the blight fungus than birds.

18. We are led to the conclusion that some insects carry a large number of spores of the blight fungus, and that they are important agents in the local dissemination of this disease. This is especially true of the beetle, *Leptostylus macula.*

LITERATURE CITED.

1. Allard, H. A. The mosaic disease of tobacco. Bul. U. S. Dept. Agr. 40: 1-33. 1914.

2. Anderson, P. J. and Babcock, D. C. Field studies on the dissemination and growth of the chestnut blight fungus. Bul. Pa. Chestnut Tree Blight Commission 3: 1-45. 1913.

3. Bary, A. de. Comparative morphology and biology of the fungi, mycetozoa, and bacteria. Translated by H. E. F. Garnsey; revised by I. B. Balfour. 525 pp. 1887. The Clarendon Press, Oxford.

4. Berlese, Amedeo. Rapporti fra la vite ed i Saccaromiceti. Ricerche sui mezzi di trasporto dei fermenti alcoolici. Rivista di Patologia Vegetale 5: 295-340. 1897. Reviewed by Giglioli, I. Insects and yeasts. Nature 56: 575-577. 1897.

5. Brenner, W. Die Schwarzfäule des Kohls. Centrbl. f. Bakt., 2 Abt. 12: 725-735. 1904.

6. Burrill, T. J. Bitter rot of apples. Bul. Ill. Agr. Exp. Sta. 118: 555-608. 1907.

7. Clinton, G. P. Apple rots in Illinois. Bul. Ill. Agr. Exp. Sta. 69: 189-224. 1902.

8. Cobb, N. A. Fungus maladies of the sugar cane. Bul. Hawaiian Sugar Planters' Association, Div. Path. and Physiol. 5: 1-254. 1906.

9. Craighead, F. C. Insects contributing to the control of the chestnut blight disease. Science, N. S. 36: 825. 1912.

10. Falck, R. Die Sporenverbreitung bei den Basidiomyceten und der biologische Wert der Basidie. Cohns Beitr. d. Pflanzen 9: 1-82. 1904.

11. Fulton, H. R. Recent notes on the chestnut bark disease. Rept. Pa. Chestnut Blight Conference, Harrisburg: 48-56. 1912.

12. Fulton, T. W. The dispersion of the spores of fungi by the agency of insects, with special reference to the Phalloidei. Ann. Bot. 3: 207-238. 1889.

13. Gain, E. Sur la contagiosité de la maladie de l'ergot chez les Graminées fourragères. Compt. Rend. Herdomadaires des Séances de la Société de Biologie 72: 189-191. 1912.

14. Grossenbacher, J. G. and Dugger, B. M. A contribution to the life history, parasitism, and biology of *Botryosphaeria Ribis*. Tech. Bul. N. Y.Agr. Exp. Sta. 18: 113-190. 1911.

15. Heald, F. D. The bud rot of carnations. Bul. Nebr. Agr. Exp. Sta. 103: 1-24. 1908.

16. Heald, F. D. Pathological investigations. Rept. Pa. Chestnut Tree Blight Commission, July 1 to Dec. 31, 1912: 40-42. Harrisburg, Pa. 1913.

17. Heald, F. D. A method of determining in analytic work whether colonies of the chestnut blight fungus originate from pycnospores or ascospores. Mycologia 5: 274-277. 1913.

18. Heald, F. D. and Gardner, M. W. The relative prevalence of pycnospores and ascospores of the chestnut blight fungus during the winter. Phytopathology 3: 296-305. 1913. Preliminary note in Science, N. S. 37: 916-917. 1913.

19. Heald, F. D. and Gardner, M. W. Longevity of pycnospores of the chestnut-blight fungus in soil. Journ. Agr. Research 2: 67-75. 1914.

20. Heald, F. D., Gardner, M. W., and Studhalter, R. A. Air and wind dissemination of the chestnut blight fungus. Journ. Agr. Research 3: 493-526. 1915.

21. Heald, F. D. and Studhalter, R. A. Birds as carriers of the chestnut blight fungus. Journ. Agr. Research 2: 405-422. 1914. Preliminary note in Science N. S. 38: 278-280, 1913.

22. Hodson, E. R. Extent and importance of the chestnut bark disease. Unnumbered Cir. U. S. Dept. Agr., Forest Service: 1-8. 1908.

23. Istvánffy, G. Ar Ithyphallus gomba és Coepophagus atka egyiittes föllépéséről hazánkban. Mathematikai és termeszettudo-mányi értesitő 21: 157-176. 1903.

24. Istvánffy, G. Ket új szőlőkárositó hazánkban. A. m. k. szőlőszeti kisérleti állomás és ampelologiai intézet közleményei 3: 1-54. 1903.

25. Horne, W. T., Parker, W. B., and Daines, L. L. The method of spreading of the olive knot disease. Pythopathology 2: 101-105. 1912. Abstract in Phytopathology 2: 96. 1912.

26. Johnson, E. C. Floret sterility of wheats in the southwest. Phytopathology 1: 18-27. 1911.

27. Johnston, J. R. The history and cause of the coconut bud-rot. Bul. U. S. Dept. Agr., Bur. Plant Ind. 228: 1-175. 1912.

28. Jones, D. H. Bacterial blight of apple, pear, and quince trees. Bul. Ontario Dept. Agr. 176: 1-64. 1909.

29. Jones, D. H. *Scolytus rugulosus* as an agent in the spread of bacterial blight in pear trees. Phytopathology 1: 155-158. 1911.

30. Jones, L. R., Giddings, N. J., and Lutman, B. F. Investigations of the potato fungus *Phytophthora infestans*. Bul. U. S. Dept. Agr., Bur. Plant Ind. 245: 1-100. 1912.

31. Klebahn, H. Die wirtswechselden Rostpilze. 447 pp. Gebrüder Borntraeger, Berlin. 1904.

32. Ludwig, F. Lehrbuch der niederen Kryptogamen. 672 pp. Ferd. Enke, Stuttgart. 1892.

33. Magnus, P. Zwei neue Uridineen. Ber. d. deutsch. Bot. Gesell. 9: 91-100. 1891.

34. Massee, G. Diseases of cultivated plants and trees. 602 pp. The MacMillan Co., New York. 1910.

35. Mercier, L. Sur le rôle des insectes comme agents de propagation de l'ergot des Graminées. Compt. Rend. Soc. de Biol., Paris 70: 300-302. 1911.

36. Metcalf, Haven. The chestnut bark disease. Yearbook U. S. Dept. Agr. 1912: 363-372. 1913.

37. Metcalf, Haven and Collins, J. Franklin. The control of the chestnut bark disease. Farmers' Bul. U. S. Dept. Agr. 467: 1-24. 1911.

38. Murrill, W. A. A serious chestnut disease. Journ. N. Y. Bot. Gard. 7: 143-153. 1906.

39. Rankin, W. H. How further research may increase the efficiency of the control of the chestnut bark disease. Rept. Pa. Chestnut Blight Conference, Harrisburg: 46-48. 1912.

40. Ráthay, E. and Haas, B. Ueber *Phallus impudicus* (L.) und einige *Coprinus*-Arten. Sitzungsber. d. math.-nat. Classe d. kaiserl. Akad. d. Wiss., Wien 87: 18-44. 1883.

41. Russell, H. L. A bacterial rot of cabbage and allied plants. Bul. Wis. Agr. Exp. Sta. 65: 1-39. 1898.

42. Schlechtendal, D. F. L. v. Eine neue Phalloidee, nebst Bemerkungen über die ganze Familie derselben. Linnea 15: 101-194. 1861-2.

43. Smith, Erwin F. *Bacillus tracheiphilus* sp. nov., die Ursache des Verwelkens verschiedener Cucurbitaceen. Centrbl. f. Bakt., 2 Abt. 1: 364-373. 1895.

44. Smith, Erwin F. A bacterial disease of the tomato, egg-plant, and Irish potato *(Bacillus solanacearum)*. Bul. U. S. Dept. Agr., Div. Veg. Phys. and Path. 12: 1-28. 1896.

45. Smith, Erwin F. *Pseudomonas campestris* (Pammel). The cause of a brown rot in cruciferous plants. Centrbl. f. Bakt., 2 Abt. 3: 408-415. 1897.

46. Smith, Erwin F. Bacteria in relation to plant diseases 2: 368 pp. Carnegie Inst. of Washington, 1911.

47. Stäger, R. Infectionsversuche mit Gramineen-bewohnenden Claviceps-Arten. Bot. Zeit. 61: 111-158 . 1903.

48. Stäger, R. Neue Beobachtungen über das Mutterkorn. Centrbl. f. Bakt., 2 Abt. 27: 67-73. 1910.

49. Stewart, V. B. The fire blight disease in nursery stock. Bul. N. Y. (Cornell) Agr. Exp. Sta. 329: 313-372. 1913.

50. Stewart, V. B. The importance of the tarnished plant bug in the dissemination of fire blight in nursery stock. Phytopathology 3: 273-276. 1913.

51. Studhalter, R. A. Insects as carriers of the chestnut blight fungus. Phytopathology 4: 52. 1914.

51a. Studhalter, R. A., and Heald, F. D. The persistence of viable pycnospores of the chestnut blight fungus on normal bark below lesions. Am. Journ. Bot. 2: 162-168. 1915.

52. Sturgis, W. C. On some aspects of vegetable pathology and the conditions which influence the dissemination of plant diseases. Bot. Gaz. 25: 187-194. 1898.

53. Waite, M. B. Results from recent investigations in pear blight. Proc. Amer. Assoc. Adv. Sci., 40th Meeting, Washington, 1891: 315. 1892.

54. Waite, M. B. The cause and prevention of pear blight. Yearbook U. S. Dept. Agr. 1895: 295-300. 1896.

55. Webber, H. J. Sooty mold of the orange and its treatment. Bul. U. S. Dept. Agr., Div. Veg. Phys. and Path. 13: 1-44. 1897.

EXPLANATION OF PLATES.

PLATE I.

Fig. 1. *Leptostylus macula* Say, one of the beetles which feeds on pustules of the chestnut blight fungus.

Fig. 2. Piece of chestnut bark showing pustules of the chestnut blight fungus eaten out by *Leptostylus macula.*

PLATE II.

Fig. 3. Series of cultures 6 days old obtained in the test of insect No. 30, *Leptostylus macula.* The upper Petri dish contained 1-100 of the water in which the insect was washed; the plate at the lower left contained 1-480; and the one at the lower right, 1-960. The last mentioned plate contained only one fungous colony other than *Endothia parasitica;* the other two represented pure cultures of the chestnut blight fungus.

PLATE III.

Figs. 4-12. Spores of fungi other than *Endothia parasitica* found in the centrifuged sediment from insect No. 44, *Leptostylus macula.*

Fig. 4, dark brown; Fig. 5, hyaline; Fig. 6, light brown; Fig. 7, light brown, Fig. 8, hyaline; Fig. 9, dark brown; Fig. 10, hyaline; Fig. 11, dark brown; Fig. 12, pale smoky.

Figs. 13-24. Spores of fungi other than *Endothia parasitica* found in the centrifuged sediment from insect No. 64, *Leptostylus macula.*

Fig. 13, light brown; Fig. 14, dark brown; Fig. 15, dark brown; Fig. 16, hyaline; Fig. 17, dark smoky; Fig. 18, dark smoky; Fig. 19, light brown; Fig. 20, hyaline; Fig. 21, light smoky; Fig. 22, light brown; Fig. 23, light smoky; Fig. 24, dark brown.

EXCHANGE
AUG 23 1916

Commonwealth of Pennsylvania

DEPARTMENT OF FORESTRY

BULLETIN NO. 13.

REPORT

OF THE

Chief Forest Fire Warden

FOR

THE YEAR 1915

Issued by Direction of the Commissioner of Forestry

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1916

All Loyal Pennsylvania Citizens Will Co-operate

FOR

Forest Fire Prevention

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* * *

PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN,
Commissioner of Forestry

IRVIN C. WILLIAMS,
Deputy Commissioner of Forestry

BUREAU OF FOREST PROTECTION

GEORGE H. WIRT,
Chief Forest Fire Warden

HOWARD W. SIGGINS,
Clerk

LETTER OF TRANSMITTAL.

Hon. ROBERT S. CONKLIN,
Commissioner of Forestry.

Dear Sir:

In accordance with paragraph (e), Section 102, Act June 3, 1915, there is transmitted herewith the first report of the Chief Forest Fire Warden, including a review of forest fire legislation in Pennsylvania by Hon. I. C. Williams, various tables relating to forest fires in 1915, a roster of forest fire wardens, and several photographs deemed valuable to a satisfactory presentation of the subject matter. It is hoped that a wide distribution of this information in bulletin form will be the cause of a more general realization of the tremendous loss suffered by the people of this State because of forest fires. Also, that it will be the beginning of a more hearty co-operation among officials, woodland owners, timber users, and those who enter the woods for business or pleasure, for the prevention and extinction of forest fires.

Yours respectfully,

GEORGE H. WIRT,
Chief Forest Fire Warden.

Harrisburg, January 27, 1916.

INTRODUCTION

There is no longer any question as to the value of forests and as to the necessity for their protection and economic management. The benefits of well cared for forests are well recognized; yet when we observe the every day attitude toward forests, we find that it does not correspond with what is believed to be the attitude which every citizen should have, be he a timber owner or not. In caring for forests, as in the management of other property, the foundation principle at stake is the matter of protection and undoubtedly the one factor against which we have to work most is the forest fire. A timberland owner may practice the most reasonable methods of forestry, including natural and artificial regeneration, all classes of improvement cuttings, a careful harvesting of the crop, and yet if his property be subject to damage from fire, and he does not provide for protection therefrom, all of the other things which he does may be lost. Any business man who would conduct a business in a way not to provide reasonable protection for his investment, and not carry reasonable insurance, would be called an unsafe business man. In fact, few people would hesitate to call him a fool.

The fact that forests influence the flow of streams beneficially is no longer disputed. The greatest factor in this influence is the humus which makes up the forest floor. Humus is the natural reservoir which Nature has provided upon our high lands and slopes for the retention of precipitation, for its filtration, and for making possible the gradual percolation of moisture into the subsoil. Once this humus is destroyed, all of Nature's provisions are unbalanced and even though our high lands were covered with a splendid growth of trees, without the humus underneath them, little or no beneficial influence upon streams would be felt. It is forest fire which destroys this humus.

This condition of affairs brings out the fact that there is another party in the case aside from the individual owner of timber land. Under conditions such as we have in Pennsylvania, there are many timber owners who simply could not provide adequate protection from forest fires without almost financial ruin. In other words, the investment which they now have in forest property will not bear the additional outlay necessary to protect the investment satisfactorily. On the other hand, the individual owner, in nine cases out of ten, is not the only one who suffers because of the destruction of the humus. It is the community at large. Consequently this community has an interest in seeing that fires are suppressed. It is reasonable, therefore, to ask that help be given to the individual owner in protecting his timber land from fire.

Even antedating the beginning of our Commonwealth, there have been laws against the setting of forest fires, but practically no attention was paid to them until it gradually was not uncommon to find people who believed that forest fires were a part of the natural order of things and that belief still remains. In more recent days, since the development of the forestry idea in Pennsylvania, efforts have been made to solve the forest fire problem and we are free to admit that it is not yet solved. The greatest difficulty in the way is the general ignorance and indifference of our people with reference to forest fires. If the people could only realize that every year we are permitting the burning up of millions of dollars worth of property, and bringing upon ourselves future trouble as an indirect result of these fires, I believe that some change in the general attitude would result. If, in any one of our towns and cities, there were a fire which would destroy, in a short period of time, a million dollars worth of property, there would not be a newspaper in the country which would not deplore the tremendous loss. The chances are that an investigation would be made into the management of the fire department and everybody would be aroused to the necessity for preventing such enormous loss. Again, if all of the indirect results which come from forest fires, namely, loss of life, loss of property other than timber, inconvenience because of lack of water and the consequent sickness and death, loss of wages, loss in taxes, depriving the citizens of game and fish for a number of years, placing the community in the midst of desolation, and so forth, could be concentrated, the whole State, and probably other States, would open up its sympathetic heart and try to alleviate the loss. Probably some effort would be made to prevent a similar calamity in that particular community; but it is a large question as to whether or not any general preventive measures would be taken to prevent a similar calamity in other communities.

It is a fact that because of forest fires, there are at least 5,000,000 acres in Pennsylvania kept in a non-productive state, and this vast area is constantly on the increase. Some of this land is now in such a condition that it may never be able to produce tree growth.

Much of it, however, is such that tree growth could be restored. With repeated fires and continuing erosion, the absolutely barren land is on the increase. At a mininm figure, the citizens of this Commonwealth are losing $20,000,000 a year because of the non-production of timber that might be growing upon these areas. The loss from the indirect effects of such an area of desolation in floods, destruction of agricultural lands, ill health, loss of life, and loss of industries other than lumbering, no one can figure out, but it must be close to 20 or 30 million dollars. Truly, we are extravagant people, burning up millions of dollars and sitting supinely by and watching the smoke.

While it is true that it is the duty of the Commonwealth to take care of its own interests, both as a timber land owner, and because of the benefits of forests to society, it must be distinctly understood that the Commonwealth is made up of the indviduals who live within its borders. The results of forest fires touch the life of every individual in the Commonwealth. It is the duty, therefore, of every individual to do his share, not simply in the suppression of forest fires but in their prevention. The attitude of the Commonwealth from this time forward must be prevention and not merely that of extinction.

"Safety First," efficiency, and conservation, are three terms that are upon the lips of the people upon all occasions. They are easily understood and appreciated. They are being applied to all phases of work, private and governmental. Efficiency commissions and the conserving of material and human wealth by national and state governments are in vogue. Although this condition exists, the people are not yet entirely awake to the foundation principle of these three ideas. The best conservation of effort, time, money, resources, health, and life is expressed in the idea of the prevention of waste. The remedying of ills and the restoration of things which can be restored are noble actions, but many ills cannot be remedied and many resources cannot be restored. The prevention of accidents and of unsatisfactory conditions is wiser, cheaper, and more far reaching than amelioration. The old saws "An ounce of prevention is worth a pound of cure" and "A stitch in time saves nine" are just as true today as they were when first uttered. Efficiency implies "safety first" and conservation.

Forestry is one branch of conservation, and the protection of forests from fire is a part of forestry. Safety first in forest management is just as wise and just as important as in manufacturing or in railroading. It is, in fact, more so. Industries could continue without the safety first idea being developed very far, but forestry is impossible without protection from fire. Any system of forestry is doomed, and is the limit of inefficiency, if forest fires are not suppressed.

It is a recognized principle that the Commonwealth has an important interest in the forests within its borders. A peculiar relation exists which, under our form of government, is rather difficult to handle, but in the majority of cases attempts to meet the problem have resulted in the purchase or retention of certain lands to be held by the State for forest management of one kind or another. Other efforts have been education, reduction of taxes, distribution of seeds and seedlings, and fire extinction. Uusually the last effort has been the weakest one.

In Pennsylvania, more recent agitation for a proper care of forests dates from 1877, and an active State policy dates from 1893. The danger and results from forest fires have been recognized all the time but the idea that the prevention of fires should take the lead of all other moves seems even yet to be foreign to the majority of our people.

There are approximately 8,000,000 acres of so-called forest land in Pennsylvania. All of it is exposed to the curse of fire. An average of 500,000 acres burns over each year. Most of it is burned over once every ten years. No system of forest management can flourish under such a condition. In the face of this fact, no Commonwealth can provide for future welfare. The direct loss from these fires is close to $1,000,000 a year, and what the indirect loss is, no one can calculate. No people can forever suffer such a useless loss, nor is it sensible to expect them to. The mere fact that they do not realize their loss is no excuse for the State's permitting the condition to exist.

As a safety measure the Legislature has permitted the expenditure of $2,300,000 to purchase 1,000,000 acres of land and an additional inadequate sum of $1,250,000 for the development of this land, more than half of which will require an expenditure of $25 an acre to get it into productive shape. It will limit the purchase price per acre to $10 and expect the Department of Forestry to protect and develop its own forests with an additional $1.25 per acre to date, and a biennial expenditure of about 40 cents per acre. Even if adequately supported, the State's 1,000,000 acres in good condition will not offset the harm of the other 7,000,000 in desolate condition. It authorizes the planting of seedlings but fails to prevent the burning up of millions of little trees for every thousand planted. It inadequately provides for what the State itself already owns. It is satisfied to appropriate $250,000 toward an experiment to eliminate the chestnut blight, but sees fit to appropriate only $45,000 for two years to protect the total area of 8,000,000 acres in accordance with a plan which is not an experiment but which has proved its efficiency in other States and within our own State Forests. Surely it is cheaper at $100,000 or even $200,000 per year to protect all the forests from fire than it is to appropriate $45,000 for two years and permit the people and the State lose many millions of dollars each year. It makes one feel like crying "How long, O Lord, how long must we wait to apply the law of safety first to forests, of efficiency in forest protection, of prevention rather than extinction." The subject is not a political one; it is vital to the very existence of the Commonwealth.

Pennsylvania is undoubtedly in the lead of all other States of the Union in general forestry work, but she has let others walk all around her in the matter of fire protection.

Since June 1, 1909, the appropriations for forest fires have been as follows:

Period covered.	Amount asked.	Approved.		Amount used.
		Date.	Amount.	
June 1, 1909 to June 1, 1911,	$80,000 00	May 13, 1909	$50,000 00	$49,999 78
Deficiency to June 1, 1911,	13,000 00	May 1, 1911	13,000 00	12,999 30
Deficiency to June 1, 1911,	25,000 00	June 14, 1911	15,000 00	14,998 13
Deficiency to June 1, 1911,	3,500 00	July 16, 1913	2,798 43	2,798 43
				$80,795 64
June 1, 1911 to June 1, 1913,	60,000 00	June 14, 1911	50,000 00	30,924 75
June 1, 1913 to June 1, 1915,	50,000 00	July 16, 1913	50,000 00	49,999 57
Deficiency to June 1, 1915,	25,000 00	June 16, 1915	17,500 00	*15,442 41
				$65,441 98
June 1, 1915 to June 1, 1917,	150,000 00	June 16, 1915	45,000 00	....

*All bills not yet paid.

This shows a total appropriation used for forest fires from June 1, 1909, to June 1, 1915, amounting to $177,162.37, or an average of $29,527.00 per year. The average for the two years, June 1, 1909 to June 1, 1911, was $40,397.82 which is almost as much as has been set aside for the reorganization of an efficient system of wardens and for fire prevention and extinction during two years. Surely the organization must be at the highest pitch of efficiency at once, which is impossible, or the forest fire seasons during the next two years must be extremely unfavorable for fires, which is not probable, or the legislature must be asked for a large deficiency, which is certain and which is poor business.

The following table giving latest figures available, is a very interesting one for comparison:

State.	Forest area protected.	Appropriation for 1913.	Average per acre to be protected.
Maine,	9,500,000	$67,900	$0.007
New Hampshire,	4,000,000	16,000	.004
Vermont,	3,000,000	3,500	.001
Massachusetts,	2,500,000	25,000	.010
Connecticut,	1,500,000	2,000	.001
New York,	7,200,000	75,000	.010
Pennsylvania,	7,500,000	*25,000	.003½
New Jersey,	1,800,000	15,000	.008
Maryland,	2,000,000	4,000	.002
Kentucky,	15,000,000	5,000	.0003
Wisconsin,	15,000,000	35,000	.002
Minnesota,	20,000,000	75,000	.004
Montana,	1,700,000	3,500	.002
Idaho,	4,000,000	15,000	.004
Washington,	15,000,000	38,000	.003
Oregon,	15,000,000	30,000	.002

*In 1915, Pennsylvania appropriated $45,000 for two years, or $22,500 for one year.

Most of the States noted obtain additional sums for fire prevention from timber owners' organizations and from the National Government.

Both Massachusetts and New York appropriate a cent per acre for fire protection. The acreage per fire in Massachusetts in 1914 (the latest figures) was 12¼ acres. In New York, the average number of acres per fire in 1914 was 33½, while in Pennsylvania in 1913 it was 508; in 1914, 305; and in 1915, 300. This in itself is a tremendous indictment against the people themselves and against the fire protective system which they have provided in particular. An effective organization is possible and Pennsylvania ought to have it.

In order to show the progress in forest fire legislation in our State, I. C. Williams, Esq., has prepared a review of such laws. It will be noted that a number of experiments have been tried and found wanting. At last an organization has been provided for that promises satisfactory results.

A REVIEW OF FOREST FIRE LEGISLATION IN PENNSYLVANIA.

By I. C. WILLIAMS, ESQ., Deputy Commissioner of Forestry.

The Province of Pennsylvania and subsequently the Commonwealth of Pennsylvania have been engaged for a period of over two hundred and twenty-five years in an effort to subdue the forest fire evil. The problem has not yet reached a solution.

When King Charles II of England, by letters patent in 1664, granted to his royal Brother James, Duke of York, all of the New Netherlands district, which by him was claimed to include the whole of the South (Delaware) River country and the colonies below, it became necessary to formulate a code of laws for the government thereof. These laws were promulgated at Hemptstead, Long Island, the same year, and were subsequently, in September, 1676, upon petition of the magistrates, extended by Governor Sir Edmund Andros to the Delaware River provinces.

Among the Duke of York's laws thus promulgated and extended is probably the first forest fire law enacted for Pennsylvania; and then enacted not for the saving of the forest, but for the protection of corn grounds and enclosures from conflagrations started within the forest. This portion of his code is as follows:

"If any Person whatsoever shall kindle any fire in the woods or Grounds lying in Common, or in his own Grounds so as the same shall runne into any Corne Grounds or Enclosures of his Neighboures, he shall be Lyable to pay all Damage; of whatsoever Sort and half so much more for a fine; or if not able to pay the Court shall Adjudge the Person guilty of Corporal punishment not exceeding tweenty Stripes, or do Service to Expiate the Crime."

In 1682 the grant of Pennsylvania was made to William Penn. At a meeting of the Provincial Assembly, held at Philadelphia, March 10, 1683, there was promulgated the following law relating to forest fires:

"Chap. XCIII. Be it &c., That Whosoever shall presume to sett on fire, any Woods, Lands, or Marshes, in this Province or territories thereof, before the first day of the first moneth yearly; They shall yearly make good all the Damages that shall thereby happen to any of the inhabitants thereof."

This law was subsequently, in 1693, abrogated by the reigning sovereigns of England, William and Mary, but was re-enacted the same year.

The next act of legislation bearing upon the subject is the act of the Provincial Assembly passed November 27, 1700. This statute was considered by the Queen in Council February 7, 1705-6, and not being acted upon, became a law in accordance with the provisions of the Charter to the Proprietary. The text of the act in full is as follows:

"An act against unseasonable firing of woods.

"For the prevention of dangers and damages that may ensue upon firing of woods at unseasonable times of the year:

"Be it enacted by the Proprietary and Governor, by and with the advice and consent of the freemen of this Province and Territories in General Assembly met, and by the authority of the same, That whosoever shall presume to set on fire any woods, lands or marshes in this province or territories, before the first day of the First month yearly, or after the first day of the Third month, shall make good all damages that shall thereby happen to any of the inhabitants thereof."

It will be seen that the firing of the woods at seasonable times, viz., during March and April of each year, was looked upon as a matter of course, something that was to be expected, and probably, from long practice, regarded as necessary in the work of clearing and settlement.

That the practice of burning the forests soon became pernicious and resulted in the destruction of fences, crops and buildings in communities which were being rapidly settled may be believed, because on March 27, 1712-13, an amendment to this act was passed, giving these damages and this destruction of property as the reason for its passage. The text of the amending section is as follows:

"And be it further enacted, That if any person or persons do at any time hereafter set on fire any woods, lands, marshes, or cripples though within the time limited by a law of this province entitled 'An act against unseasonable firing the woods,' within one mile of any fences or buildings, without giving notice to the possessor of such improvements at least twenty-four hours before he do so, he or they shall pay all damages that shall thereby happen to any such buildings or fences."

The next act dealing with the forest fire question was passed March 29, 1735. This law distinctly shows a marked change in sentiment with respect to the expediency of setting such fires. Up to this time firing the forest was not looked upon as an offense punishable criminally, except in the Duke of York's first statute. Previous legislation was directed toward the recovery of compensatory damages. The act of 1735 contains a penal provision, but this was applicable to servants and slaves only. We see here the distinction preserved to this time between the land owner who was supposed to set fires for beneficial reasons and without malice, and similar acts of servants and slaves, who being non-owners, were presumed to act maliciously. The act of 1735 is an interesting piece of legislation and is as follows:

"An act to prevent the damages which may happen by firing of woods.

"Whereas by an act the general assembly of this province passed in the twelfth year of the reign of King William the Third it is enacted that whosoever shall presume to set on fire any woods, lands or marshes in this province or territories before the first day of the first month yearly or after the first day of the third month shall make good all damages that shall thereby happen to any of the inhabitants thereof. And whereas it hath on experience been found that the setting the woods on fire at any time hath proved rather hurtful than beneficial to this province and great losses have happened by occasion of such fires:

"For the prevention thereof:

"Be it enacted by Patrick Gordon, Esquire, Lieutenant-Governor with the King's royal approbation under the Honorable John Penn, Thomas Penn and Richard Penn, Esquires, true and absolute Proprietories of the Province of Pennsylvania and of the counties of Newcastle, Kent and Sussex on Delaware, by and with the advice and consent of the representatives of the freemen of the said Province in General Assembly met, and by the authority of the same, That the act of assembly hereinbefore recited and every clause and article therein be and is hereby repealed to all intents, constructions and purposes whatsoever.

"And be it further enacted by the authority aforesaid, That whosoever shall presume at any time or times hereafter to set on fire or cause to be set on fire any woods, land or marshes whatsoever within this province, so as thereby to occasion any loss, damage or injury to any other person or persons, every such person or persons so offending shall and are hereby declared liable to make satisfaction for the same in any action or actions on the case to be brought by the party or parties grieved in the court of common pleas in the county where the offense was committed.

"Provided always, and be it further enacted by the authority aforesaid, That where the party injured shall not demand above forty shillings for his loss or damage, it shall and may be lawful to and for such person or persons to apply to any justice of the peace of the county where the offense is committed, who is hereby empowered and required by warrant under his hand and seal to cause the party offending to be brought before him or some other justice of the peace of the same county, and if upon examination it shall appear to such justice by the testimony of one or more credible witnesses that the defendant is guilty of the charge exhibited against him, then the said justice shall issue forth his warrant to two or more substantial freeholders of the neighborhood, thereby commanding them in the presence of the defendant (if he will be present) to view the place or thing damnified or inquire into the loss sustained by the plaintiff, and to certify to the said justice upon their oath or affirmation what damage in their judgment the plaintiff hath sustained by occasion of the premises; and that upon return of such certificate to the said justice he is hereby empowered to grant execution for the recovery of the said damages, together with such costs of prosecutions as is usual in the recovery of debts under forty shillings.

"Provided also, That no costs of suits shall be paid to any plaintiff in any suit to be brought for any matter or thing in this act mentioned if the jury who shall try the cause do not assess above forty shillings damages, any law, custom or usage to the contrary in anywise notwithstanding.

"Provided also, That where any offense shall be committed against the tenor of this act by any servant, negro or slave without the direction of his, her or their master or mistress respectively, and such offender be thereof duly convicted by the oath or affirmation of one credible witness before any justice of the peace of the respective counties, such offender or offenders, unless his or her master or mistress will pay the damages sustained with costs of suit, shall be whipped with any number of stripes not exceeding twenty-one on his or her bare back at the direction of the justice before whom the party shall be convicted and further shall be committed to the workhouse of the county where the offense is committed, there to remain until the costs of prosecution shall be paid."

This law recognized no "seasonable" time for setting the forest on fire. It continued unchanged for sixty years. The independence of the colonies had been secured, the national government had been successfully organized, and the promise of uninterrupted industrial success was before the minds of the people. The reduction of the forest land to agricultural purposes was gradually being accomplished. The evil of wilful and negligent firing of the forests was becoming more apparent and more burdensome. Therefore, further to deal with the problem and mould the law to meet the changed conditions, the act of April 18, 1794, was passed, and the probabilities are that the second and third sections of this act are still in force. This act is as follows:

"An act to prevent the damages which may happen by firing of woods.

"Whereas, it has been represented that numbers of persons are in the custom of setting fire to the woods for different purposes, thereby producing an extensive conflagration, injurious to the soil, destructive to the timber, and the infant improvements within the State: Therefore

"Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That whoever shall at any time hereafter wilfully set on fire, or cause to be set on fire, any woods, lands or marshes whatsoever, within this Commonwealth, so as thereby to occasion any loss, damage, or injury to any other person or persons, every such person or persons, so offending, and being thereof legally convicted by the oath or affirmation of one or more witnesses, in the county court of quarter sessions where the offense is committed, shall pay a fine not exceeding fifty dollars, and not less than twenty dollars, the one-half of such fine to be paid to the informer, and the other half to the overseer of the poor of the township where the offense is committed, for the use of the poor in the said township.

"Section II. And be it further enacted by the authority aforesaid, That where any persons so offending as thereby to occasion any loss, damage, or injury to any other person or persons, every such person or persons so offending, shall be and hereby are declared liable to make satisfaction for the same, in any action or actions on the case, to be brought by the party or parties grieved, in the court of common pleas of the county in which the offense was committed.

"Section III. And be it further enacted by the authority aforesaid, That where any party is injured, and shall not demand above fifty dollars for his loss or damage, it shall and may be lawful to and for such person or persons to apply to any justice of the peace of the county where the offense is committed, who is hereby empowered and required, by warrant under his hand and seal, to cause the party offending to be brought before him or some other justice of the peace of the same county; and if, upon examination, it shall appear to the justice, by the testimony of one or more credible witness or witnesses, that the defendant is guilty of the charge exhibited against him, then the said justice shall issue his warrant to two or more free-holders of the neighborhood, thereby commanding them, in the presence of the defendant, if he will be present, to view the place or thing damaged, or inquire into the loss sustained by the plaintiff, and to certify to the said justice, upon their oath or affirmation, what damage, in their judgment, the plaintiff hath sustained by the occasion of the premises; and upon the return of such certificate to the said justice, he is hereby empowered to grant execution for the recovery of the said damages, together with the costs of prosecution, as is usual in the recovery of debts under ten pounds: Provided, That if any person or persons shall apprehend him, her, or themselves aggrieved by the determination of any justice of the peace, in consequence of this act, he, she, or they shall have a right to appeal from the judgment of the said justice to the next court of common pleas of the proper county.

"Section IV. And be it further enacted by the authority aforesaid, That where any offense shall be committed against the tenor of this act, by any white or black servant, without the direction of his, her, or their master or mistress, respectively, and such offenders be thereof duly convicted, by the oath or affirmation of one credible witness, such offender or offenders, unless his or her master or mistress will pay the damages sustained, with costs of suit, shall be committed to the gaol of the county, there to be kept to hard labour for three months, and from thence until the cost of prosecution be paid.

"Section V. And be it further enacted by the authority aforesaid, That the act, entitled 'An act to prevent the damages that may happen by firing of woods,' passed the twenty-ninth day of March, one thousand seven hundred and thirty-five, is hereby repealed and made null and void."

Herein the criminal aspect of starting forest fires was further emphasized. What was formerly a crime only when committed by a servant or a slave now became so without distinction of person.

The act of March 29, 1824, was passed to prevent the destruction of woods and timber land by unlawful cutting as well as by fire. The first three sections of this law relate wholly to unlawful cutting, and the penalties to be applied therefor. The title to the act and the fourth section are as follows:

"An act to prevent the destruction of timber, and supplementary to the act entitled, 'An act to prevent the damages which may happen by firing woods,' passed eighteenth of April, seventeen hundred and ninety-four."

* * * * * * * *

"Section 4. And be it further enacted by the authority aforesaid, That whosoever shall wilfully set on fire, or cause to be set on fire, any woods, lands or marshes, whatsoever, within this commonwealth, every such offender or offenders, being thereof legally convicted by the oath or affirmation of one or more witnesses, in the county court of quarter sessions of the peace, where such offense has been committed, shall pay a fine not exceeding five hundred dollars, one-fourth to the informer, and the residue to the overseers or directors of the poor of the township or county, as the case may be, where such offense has been committed, for the use of the poor of such township or county; and shall moreover undergo an imprisonment at hard labor in the jail of the proper county, for any term not exceeding one year."

The fifth section of this act repealed directly the first and fourth sections of the act of April 18, 1794, *supra*.

When the codification of the criminal laws of the Commonwealth was undertaken in the year 1860, the subject of the malicious firing of forests and woodlands was comprehended in the eighth division, relating to offenses against real property. Section 140 of the act of March 31, 1860, commonly called the "Criminal Code," reduces the penalty fixed by the act of 1824, from five hundred dollars to one hundred dollars, leaving the term of imprisonment at twelve months, as in the former act. This law, however, does not cover the case of negligently allowing the escape of fire from one's own lands to the lands of another. While this offense could no doubt have been comprehended under the general law of negligence in an action for damages, yet subsequent legislation made this a misdemeanor and fixed a penalty therefor.

Until the year 1867 no special laws relating to this subject had been enacted; but at this session was passed the act of March 26, 1867, fixing penalties for setting forest fires in the counties of Clearfield, Fulton and Elk. It also extended the statute of limitations so that prosecutions might be brought within six years.

This is the first statute which offers a reward as such, for the apprehension and conviction of the offender. It directs the county commissioners to pay to the prosecutor in every such case the sum of fifty dollars and to the district attorney who secure the conviction the sum of twenty dollars.

Following the act of 1867 was another special act approved the 9th day of April, 1869, relating only to Union county. By the act of June 2, 1870, the provisions of this law were extended to the counties of Schuylkill, Lehigh, Berks, Lycoming, Centre, Snyder and Luzerne, from which Lycoming was subsequently excepted by act of May 19, 1871. The penalties imposed are fines ranging from fifty to five hundred dollars and imprisonment from one month to twelve months, within the discretion of the court. It continues the idea of reward contained in the special act of 1867 by providing for the payment to the informer of one-half of the fine imposed.

The preamble to this act of 1869 is interesting from the fact that it offers as a reason for the passage of the act some of the ideas which the forestry administration of the State has been urging upon the people from the very inception of its work. The reports of the Division of Forestry up to 1897 amply prove this statement. The preamble is as follows:

"Whereas, There being certain mountain and other wild lands in the county of Union which are fired from year to year, thereby destroying the young timber and causing the land to be worthless for the purpose of timber: And whereas, Should such young timber not be destroyed it would add to the value of the land, in the course of twenty years, from fifty to one hundred dollars per acre, thus increasing the wealth of the county thousands of dollars, therefore, &c."

The legislative assembly of 1879, in considering the matter of forest fires, followed that of ten years earlier in writing into the general statutory law of the State the provision for paying a reward for the arrest and conviction of such offenders. By the act of 11th June, 1879, the penalty of one hundred dollars fixed by the act of 1860 was raised to three hundred dollars, with a term of imprisonment as formerly. The county commissioners were therein directed to pay to the prosecutor, after conviction of the defendant, the sum of fifty dollars as a reward.

This continued to be the state of the law until the passage of the more comprehensive act of June 1, 1887, providing for the encouragement of forest culture and imposing penalties for the injury and destruction of forests. In addition to the offenses defined in former laws there are added here those of carrying over or into any forest any lighted candle, lamp, or other fire without having the same inclosed in a lantern or other closed vessel; the discharging of fireworks on forest land or among the trees thereon; and carelessly or wilfully starting fires on one's own land so as to communicate fire to such forest or timber lands belonging to others. The penalty was inadequately fixed at fifty dollars for each offense, but was increased to one hundred dollars by an amendment approved May 14, 1891. In case of the refusal or inability to pay a fine, the defendant is to be committed to the county prison for a period of one day for each dollar of penalty imposed.

This act contains an innovation in forestry law, and one withal that is wholly commendable, being in line with the determination of later legislatures to have small causes finally disposed of in the justice's office. It gives to justices of the peace the power of summary conviction, saving to the defendant the right of appeal to the court of quarter sessions when the fine imposed is over five dollars.

Every one who understands the situation knows that the fire menace in the forests is the great drawback to a wholly successful forest policy in this State. Among all the States, Pennsylvania is yielded the prize for a business-like forest administration, and with a policy for the future outlined. Relating to the forest fire problem we seem to have a plethora of laws, and yet this problem is unsolved. An act, wise and far-reaching in its conception, is that of March 30, 1897, and if rigidly applied and adhered to would have prevented the wholesale burning and destruction of valuable forests. This is the act making constables of townships ex-officio fire wardens, giving them authority to summon help for extinguishing fires in their respective townships, providing for the payment of those so engaged and dividing the cost thereof between the county and the State. It likewise required constables to make to the courts quarterly returns of violations of the forest fire laws, providing penalties for failure to do so, and making it the "*special duty of the judge of said court to see these returns are faithfully made.*" This act was more honored in the breach than in the observance. The constables refused to extinguish fires because the commissioners refused to pay them. It is un-

American to be compelled to perform labor without just compensation, except as a punishment for crime. The commissioners refused to pay because they caught at the straw of unconstitutionality and stubbornly adhered thereto, notwithstanding that to this time the logic and weight of the argument was overwhelmingly on the side of entire constitutionality.

The act of March 22, 1899, is practically a repetition or reduplication of the act of March 30, 1897, so far as it relates to making the constables ex-officio fire wardens. It, however, extends to borough constables and gives them the power to arrest without warrant, the same authority with which they are invested by the act of 29th April, 1897.

The act of April 29, 1897, last cited, authorizes constables and other peace officers to arrest on view without warrants persons detected in the act of trespassing upon forests or timber lands upon such circumstances as to warrant the suspicion that there has been committed or is about to be committed some offense against the laws for the protection of such lands.

As was well said by the former Commissioner of Forestry, it is better to prevent fires from starting than to extinguish them after they have begun. That this fact has been patent to the Legislature for a period of more than thirty years is evidenced by an act approved June 2, 1870, entitled "An act to protect timber lands from fire," the preamble to which is as follows:

"Whereas, It is important to the people of the State that timber land should be protected from fire, which, owing to malicious conduct and carelessness of individuals, is causing vast havoc to the young growing timber, especially upon our mountains, therefore, &c."

The trained detective on guard will do more real good in preventing fires than many men summoned to extinguish them after once started. The above act of 1870 calling for the appointment of such detectives was improved and its scope enlarged by the amendment thereto approved July 15, 1897. The amendment fixes the penalty for the refusal of county commissioners to appoint detectives, it divides the expense of maintaining detectives between the county and the State, and fixes a limit of $500 to the expense to be incurred on this account by a county in any one year.

The purposes of the act of 1870 were further enlarged by the act of May 2, 1901, which provides that where county commissioners fail or refuse to appoint detectives to ferret out and bring to punishment those who cause the burning of timber lands, the Commissioner of Forestry may make such appointments on request. When the Commissioner makes such appointments and convictions are obtained thereby, the county wherein such fires and convictions occurred may be deprived of State aid for inefficient county detectives appointed for the same purpose.

The cause of forestry in Pennsylvania received an impetus in the creation of a Department of Forestry by the act of February 25, 1901. The raising of the forestry work to be a co-ordinate branch of the State government has lent to it a solidity and dignity which it might otherwise not have attained so early. That portion of the Department act relating to forest fires is section two, referring only to the kindling of fires upon the reservations. It imposes a penalty of from $100 to $500 with costs; and in default of payment of both, an imprisonment until both are paid.

To provide for a more thorough protection of forest lands and give more effectiveness to the work of the employes of the Department of Forestry, the Legislature, by act of March 11, 1903, conferred upon them the same power given to constables by the act of April 29, 1897; that is, after taking the oath required of constables, to arrest on view and without warrant all persons detected trespassing upon forest or timber land under such circumstances as to warrant the reasonable suspicion that such persons have committed, are committing, or about to commit some offense against the laws for the protection of such lands, or some infraction of the rules and regulations made for the government of the reservations. This gives power and large discretion, but not more than the circumstances surrounding such offenses usually demand. It is so easy to start a fire, so easy to make rapid retreat, so difficult to prove the crime after the offender has left the locality, that every obstacle should and of right ought to be removed from the exercise of all reasonable measures necessary to detect and bring the guilty to punishment.

By reason of the office held by constables they were made ex-officio forest fire wardens, and their duties were prescribed by various items of legislation passed from time to time as above shown. In the main they were charged with the hiring of men, the extinguishing of fires, and the submission of bills to county commissioners to meet the costs. The expense was to be paid by the county in the first instance, after which a portion was to be reimbursed to the counties from the State Treasury. In the more recent acts, which were principally amendatory of earlier laws, the amount per hour allowed for fighting fires was raised from 15c. to 25c. per hour, and those who were employed by the officers for this purpose were directed to receive 20c. per hour for their services.

The act of 31st March, 1905, P. L. 89, is an act amending the earlier law of 1897. In addition to raising the pay of the persons fighting fires, it conferred the additional power upon the officers to go out and extinguish an approaching fire. By these means a first step was taken toward the prevention of fires rather than their extinguishment after they have invaded a forest. This law also raised from $10.00 to $20.00 the penalty which should be imposed upon a person who refuses to respond to a call for help.

In 1907 the Legislature passed two laws relating to the subject of forest fires. The act of 25th April, 1907, P. L. 101, reaffirms the making of constables ex-officio fire wardens, and to the fire fighting force adds the members of the Department of Forestry. Their duties are prescribed therein and are much the same as those provided for in earlier laws. Prior to this act of 1907 a person who combatted forest fires without having first been called upon to do so by an officer, was not permitted to receive compensation for the work done. This situation frequently deterred persons from extinguishing fires, because having no direct personal interest in the timber that was burning, they could not afford to leave their employment unless payment for the service so rendered might be had. This law permits the fire warden to pay for such services provided he is satisfied that the service was faithfully rendered.

The second act of 1907, that of June 12th, P. L. 527, is limited in its application to the oil and gas regions of the State. It makes a closed season for the burning of brush and woodlands. During such seasons no fires might be started except under written permission from a fire warden, and then only provided certain precautions are taken. It further required that the owner or lessee of forest lands containing producing oil or gas wells, should once a year remove from a space within 100 feet of the wells, all inflammable material, and also to remove such material from the lands when within 100 feet of the right of way of an operating railroad. Every railroad company was likewise required to keep its right of way clear of grass, brush, and inflammable materials; to use spark arresters, and to prevent the escape of fire from ash pan and furnaces. No railroad company was permitted to dump burning coals on their right of way near such lands, and should a fire occur on neighboring lands within 100 feet of its tracks, the railroad company was required to assist in extinguishing the fire.

At the legislative session of 1909, an attempt was made to create a new system of fire wardens and new methods of extinguishing fires and paying the expense thereof. The purpose of this act was to prevent as well as suppress forest fires. All the laws relating to constables and their service as ex-officio fire wardens were repealed. The Commissioner of Forestry was directed to appoint a district fire warden in every borough and township in the State where there was need for such an official. The district warden was permitted to have assistants. The employes of the Department of Forestry were continued as ex-officio fire wardens. No owner or lessee of lands might recover any compensation for extinguishing fire upon his own lands. The pay of the wardens, their assistants and employes was continued the same as in former laws. Under this act all expense was to be paid in the first instance by the Commonwealth. At the end of the year the Auditor General was directed to collect from each board of county commissioners one-fifth of the amount of the expense for extinguishing fires in the respective counties. The fire wardens were not limited to the regions for which they were appointed, but might enter other townships or boroughs for the purpose of preventing fire. The expense of extinguishing fires in more than one county by the same person was to be apportioned among the counties. Those who fought and extinguished fire without having first been employed or directed to do so, were entitled to receive compensation upon proper proof. The act removed all personal liability from the fire wardens for acts done within the scope of their duty. Section 18 of this law gave the Commissioner of Forestry power to appoint persons to keep daily patrol during what are commonly known as the fire seasons. At no time did the Legislature ever appropriate sufficient money to carry out the provisions of this section. Fire wardens had authority to arrest on view persons who were detected committing an offence against any of the laws for the protection of forests and woodlands. They also were given authority to impress persons into service when such service was imperatively demanded.

By a consolidation of the laws relating to the protection of State Forests from fire as well as other woodlands not included in State Forests, by means of the acts of 1911, P. L. 163 and 861, the earlier conflicting statutes respecting forest and woodland fires were reduced to two simple sections. In the first act mentioned, which is for the protection of the State Forests, it is provided that if any person shall wilfully, negligently, or maliciously kindle a fire within any forest belonging to the Commonwealth, or shall set fire upon adjacent lands by means of which it shall be communicated to State Forests, he shall be guilty of a misdemeanor and subject to a fine not exceeding $1,000, or imprisonment not exceeding six months. In order that there might be no uncertainty with respect to the meaning of the word "Person" in this law, a person is defined to be not only an individual or natural person but the artificial persons now existing in contemplation of law, as well as their officers, agents, or employes.

The act for the protection of trees and woodlands passed at the same session and relating to woodlands other than those included in State Forests, carries the same prohibitions and imposes the same penalties for violation.

In Monroe county there is now and has been for a number of years an association of land owners brought together to protect their woodland holdings from fire. The Pocono Protective Fire Association has been able to prevent largely the fire evil on the lands of its members. In order to heighten the interest of this and similar associations which might be formed, and to induce the formation of like associations for the local protection of woodlands, an amendment to the fire wardens' code of 1909 was approved July 22, 1913, P. L. 906. Wherever such association is formed for the above purpose and it is desired to cooperate with the State in the prevention of fires, the Department of Forestry is authorized to enter into such relationship and appropriate from its forest fire fund a sum of money equal in amount to that expended by the local association for the employment of patrolmen. This act was recast at the session of 1915, P. L. 815, and provides that the Department and the local association shall jointly share the expense which may be incurred not only in the actual extinguishment of fires, but in their prevention. Since the passage of this law originally, the Central Pennsylvania Forest Fire Protective Association has been formed and the Department of Forestry has been cooperating with these two local associations.

The belief has been prevalent for some time that the laws relating to the whole forest protective system should be revised and clarified. Protection from forest fires includes a large portion of the endeavor necessary for proper protection; but there are other subjects as well which come under the head of protection. It is of importance to protect private forests from harmful agencies other than fire. The whole subject was carefully gone over and revised at the session of 1915. The result is the forest protection code of 1915, P. L. 797. This is undoubtedly the most expressive and far reaching law which has yet been passed in this State. The chief forest fire warden is an officer of the Department of Forestry and he gives his whole time to the subject of forest protection. He is charged with the duty of seeing that competent and active persons are appointed to the office of fire warden, and carefully checks up all their activities. Increased power is given the Bureau of Forest Protection created by this law, over the railroads, which in the past have been so negligent respecting forest fire. He may declare a situation to be a nuisance and direct its abatement when, in his judgment, its continuance would be promotive of forest fire danger. District fire wardens are limited to foresters in the employ of the Department of Forestry, and these are given more ample powers than they have heretofore had under existing law. Local fire wardens are chosen solely for their qualifications and their ability to serve well in the office. Occasionally in various parts of the State there are persons who are glad to act in the capacity of fire warden without expectation of compensation. This they do because of their general love for the forest and their desire to see it preserved from destruction. Such persons may be appointed special fire wardens. The foresters and rangers in the employ of the Department of Forestry are all ex-officio fire wardens under this act. They receive only their expenses incurred in the performance of their duty.

This new law has been in effect since the date of its approval, June 3, 1915. A complete revision of the personnel of the fire fighting force is being made and has progressed well toward a conclusion. A better body of men is now in the employ of the State, ready to act in this service intelligently and with the sole desire to perform their duties well. The law is giving satisfaction thus far and the belief is that when fully applied and better understood it will meet the case against forest fires more completely than anything which has yet been tried in Pennsylvania.

Jan. 4, 1916. I. C. W.

THE NEW FOREST PROTECTION CODE.

AN ACT

To establish a Bureau of Forest Protection within the Department of Forestry; designating the officers who shall constitute the Bureau, their duties and salaries; prescribing penalties for the violation thereof; and repealing all laws, general, special, or local, or any parts thereof, that may be inconsistent with or supplied by this act.

Section 1. Be it enacted, &c., That a Bureau of Forest Protection is hereby established within the Department of Forestry. The persons appointed thereto or assigned to duty therein shall be subject to the authority and under the control of the Commissioner of Forestry.

ARTICLE I.

Chief Forest Fire-Warden.

Section 101. Appointment.—Immediately after this act becomes effective, and thereafter whenever a vacancy occurs, the Commissioner of Forestry shall appoint a forester in the employ of the department to be chief forest fire-warden.

Section 102. Duties:

(a) It shall be the duty of the chief forest fire-warden to take such measures for the prevention, control, and extinction of forest fires as will assure a reasonable protection from fire to woodlots, forests, and wild lands within the State.

(b) The chief forest fire-warden shall institute the system of forest fire-wardens, as hereby created, and shall have authority to supervise and manage the same.

(c) He shall reorganize the former system of fire-wardens, and as rapidly as possible make it conform to the provisions of this act.

(d) As soon as convenient after this act becomes effective, the chief forest fire-warden shall divide the State into forest fire districts, for the organization of an effective forest fire-warden system.

(e) At the end of each calendar year he shall render to the Commissioner of Forestry a report for the year, covering all phases of the work under his direction, which report, together with a list of the fire-wardens, shall be published annually as a bulletin of the Department of Forestry.

(f) He shall collect, with the assistance of the force and means at his command, data relating to location, area, and fire hazard of woodlots, forests, and wild lands within the State; data relating to forest fires, and losses resulting therefrom; and such other data as he may deem to come within the purview of his duties, and as he may desire to present to the commissioner or to the public.

(g) He shall tabulate and draft data in such manner that the information may be easily and readily appreciated. Maps, drafts, and tables shall be published, in the discretion and under the direction of the Commissioner of Forestry, as a part of the annual report of the chief forest fire-warden or as separate bulletins of the department.

(h) He shall plan and put into effect as rapidly as convenient a system of fire-towers and observation stations, which shall cover the regions subject to forest fires, purchase the necessary material and equipment, and hire the necessary labor for the installation of the system.

(i) When, in his discretion, the purposes of this act may be accomplished better by the appointment of certain forest fire-wardens as watchmen or patrolmen during dry seasons, and within regions subject to great fire risk, he shall make such appointments; provided that no person shall be appointed watchman or patrolman without first having been appointed a forest fire-warden, and that wardens who have proved to be efficient shall be given preference.

(j) He may enter into agreements, with the consent of the Commissioner of Forestry, with persons, firms, corporations, or associations, upon satisfactory terms, for the successful accomplishment of forest fire prevention or control.

(k) He shall conduct such educational work in relation to forest fires as may be approved by the Commissioner of Forestry.

(l) He shall audit all bills incurred under this act. He shall approve those which are correct and should be paid and present them to the Commissioner of Forestry, who shall transmit them to the Auditor General.

(m) Upon receipt of checks from the State Treasurer, he shall send them to the persons entitled thereto.

(n) He shall have authority to declare a public nuisance any property which, by reason of its condition or operation, is a special forest fire hazard, and, as such, endangers other property or human life.

(o) He shall notify the owner of the property, or the person responsible for the condition declared a public nuisance, and advise him as to the abatement or removal of such nuisance. In the case of a railroad, such notice shall be served upon the superintendent of the division upon which the nuisance exists.

(p) He shall collect and arrange information obtained concerning violation of laws relating to the protection of forests from fire, and present the same to the Commissioner of Forestry, who shall file it with the Attorney General for legal action.

Section 103. Compensation.—The chief forest fire-warden shall be paid a salary not to exceed two thousand five hundred ($2,500) dollars per annum, and necessary expenses incurred in the performance of his duties.

ARTICLE II.

Clerical Assistants.

Section 201. As soon as convenient after this act becomes effective, the Commissioner of Forestry shall assign to the Bureau of Forest Protection a forester in the employ of the department, to act as a clerk to the chief forest fire-warden: and, from time to time, may assign such other clerical assistants to the bureau as may be necessary.

ARTICLE III.

District Fire-Warden.

Section 301. Appointment.—As rapidly as fire districts may be determined upon by the chief forest fire-warden, and thereafter whenever vacancies occur, the Commissioner of Forestry shall appoint foresters in the employ of the department, to be known as district fire-wardens.

Section 302. Duties:—

(a) The district fire-warden shall establish headquarters at some advantageous place within his district; shall act as the field representative of the chief forest fire-warden, and be under his direction.

(b) He shall be responsible for the collection of data, within his district, necessary for accomplishing properly the purposes of this act.

(c) He shall make recommendations to the chief forest fire-warden for the appointment of local fire-wardens, the location of fire-towers, the employment of patrolmen, and the region to be patrolled, and regarding such other matters as may come to his attention which would tend to improve the protective system.

(d) He shall arrange for annual meetings of fire-wardens within his district, for instruction in forest fire matters.

(e) He shall report to the chief forest fire-warden situations and conditions existing within his district which are or may become forest fire hazards. He shall serve notices for the correction or removal of such conditions, when issued by the chief forest fire-warden.

(f) He shall receive, audit, and approve the reports and accounts of the local fire wardens before submitting them to the chief forest fire warden.

(g) He shall act as an inspector of the work of local fire-wardens, and render assistance to them.

(h) He shall conduct educational work, and develop co-operation between local agencies and the Department of Forestry for the prevention and suppression of forest fires.

(i) He shall perform such other duties as may be assigned to him by the Commissioner of Forestry or the chief forest fire-warden.

Section 303. Compensation.—The district fire-warden shall be paid a salary not to exceed one thousand eight hundred ($1,800) dollars per annum, and all necessary expenses incurred in the performance of his duties.

ARTICLE IV.

Local Forest Fire-Wardens.

Section 401. Qualifications.—A person appointed a local fire-warden shall be chosen expressly by reason of his physical fitness, sobriety, honesty, and ability to perform the duties herein required, and must have the recommendation of the district fire warden for the forest fire district in which he is located. Where no district fire-warden has been appointed, the chief forest fire-warden shall first satisfy himself as to the above qualifications before making an appointment.

Section 402. Appointment.—Local fire-wardens shall be appointed by the chief forest fire-warden in such localities as he may deem necessary.

Section 403. Certificates of Appointment.—Every person appointed a forest fire-warden under this act shall be given a certificate of appointment, issued by the chief forest fire-warden, and may be furnished with an appropriate badge, in the discretion of the chief forest fire-warden.

Section 404. Duties:—

(a) Whenever fire is discovered in or approaching woodlots, forests, or wild lands, whether the same be owned by individuals, corporations, or by the Commonwealth, it shall be the duty of a forest fire-warden immediately to take such measures as are necessary to extinguish the fire.

(b) Whenever fires have been combated or extinguished as provided for in this act, the forest fire-warden shall prepare a correct statement of expenses, upon forms to be furnished by the department; which statement must be verified by oath or affirmation, and must be filed with the district warden, and by him forwarded to the chief forest fire-warden within sixty days of the date of fire.

(c) He shall promptly investigate the cause of each fire which comes to his knowledge, collect such evidence as may be discovered relating thereto, and such other facts as he may be directed, and report the same to the chief forest fire-warden.

(d) Upon receipt of a check from the State Treasurer, he shall at once pay by check the amounts due to such persons as are entitled to receive pay from him.

(e) He shall attend an annual meeting of fire-wardens in his district when notified, or present a reasonable excuse.

(f)) When designated as a patrolman or watchman, he shall perform such duties as may be assigned him by the chief forest fire-warden or by the district fire-warden.

Section 405. Compensation.—Each local fire-warden shall be paid at the rate of thirty cents per hour for the time actually employed in the performance of his duties. He shall also be paid for the necessary expenses incurred in the performance of his duties. In addition, he shall be paid annually the sum of ten dollars; provided that the Commissioner of Forestry may withhold this annual sum for just and reasonable cause.

A local forest fire-warden shall not be paid from the forest fire fund, for services in any one month, an amount in excess of fifty dollars.

ARTICLE V.

Special and Ex-Officio Forest Fire-Wardens.

Section 501. The chief forest fire-warden may appoint persons who will serve without compensation as special or as ex-officio forest fire-wardens. They shall have the same power and authority as local forest fire wardens, but their duties may be changed or extended by the chief forest fire-warden.

Section 502. Foresters and rangers in the employ of the Department of Forestry shall be forest fire-wardens ex-officio.

Section 503. Special and ex-officio forest fire-wardens shall receive no compensation under this act, other than the necessary expenses incurred by them in the performance of their duties as fire wardens.

ARTICLE VI.

General Powers.

Section 601. A fire-warden shall have authority to employ such other persons as, in his judgment, may be necessary to render assistance in extinguishing fire; and, whenever it shall not otherwise be possible for him to secure a sufficient number of persons to assist in extinguishing fire, he is hereby authorized to compel the attendance of persons and to require them to render assistance in the extinguishing of fire, under penalties prescribed in this act.

Section 602. A fire-warden shall have authority to administer an oath or affirmation, in order to examine any person who he believes knows facts relating to any fire, or who claims compensation for services rendered.

Section 603. Every official provided for by this act shall have authority to enter upon any land at any time for the purpose of performing duties in accordance herewith.

Section 604. A fire-warden shall have power to arrest on view, without first procuring a warrant, any person detected by him in the act of committing an offense against any of the laws now enacted or hereafter to be enacted for the protection of forests, woodlots, timber, or wild lands, or when he shall have a reasonable suspicion that any person is committing or is about to commit some such offense. The warden shall have further power to take the offender before a justice of the peace, or other magistrate having jurisdiction, for hearing trial, or other due process of law. The further conduct of any such case shall be entrusted to, and be undertaken by the Attorney General.

Section 605. A fire-warden shall not be personally liable for any act required or permitted to be done under the provisions of this law, while acting within the scope of his duties as a fire-warden.

ARTICLE VII.

Private Persons.

Section 701. Fire-Fighters.—Persons who extinguish forest fires, except as otherwise provided, shall be paid at a rate per hour to be determined for each fire district by the chief forest fire-warden, with the approval of the Commissioner of Forestry, and based upon the rates of wages received for day labor within the respective fire districts; provided the rate does not exceed twenty-five cents per hour.

Section 702. Appeal to the Commissioner of Forestry.—If any person shall feel aggrieved by the act of any fire-warden, such person may appeal to the Commissioner of Forestry, who will examine into the complaint. After hearing the parties he shall decide as to him shall seem just and right.

Section 703. Land Owners.—Nothing in this act shall be so construed as to relieve the owner or lessee of lands, upon which fires may burn or be started, from the duty of extinguishing such fire so far as may lie within his power.

No owner or lessee of land upon which fire may burn or be started, nor any person during employment with such owner or lessee, nor any other person with a present vested interest in such land, shall receive compensation under this act for extinguishing fire upon his land or the land to which his interest is attached.

No person who is responsible for the spreading of a fire to a woodlot, forest, or wild land, nor any person in his employ, may receive compensation from a fire-warden for helping to extinguish such fire.

ARTICLE VIII.

Railroads.

Section 801. All steam and electric railroad companies owning or operating lines of railroad within the State shall put into effect such reasonable regulations for the prevention of forest fire as may be deemed necessary by the chief forest fire-warden, providing the regulations be approved by the Public Service Commission.

ARTICLE IX.

Expenses.

Section 901. Expenses incurred under this act shall be paid from the general forest protection appropriation.

Section 902. No bills of expense relating to the protection of forests from fire, incurred under this act, shall be honored by the chief forest fire-warden unless presented to him within sixty days after the expense has been incurred.

Section 903. The Auditor General shall satisfy himself as to the correctness of all bills transmitted to him by the Commissioner of Forestry for expense incurred under this act, and shall then draw his warrants against the general forest protection appropriation in favor of the persons and for the amount shown by the approved bills.

ARTICLE X.

Penalties.

Section 1001. Penalty for Neglect of Duty.—If a fire-warden shall fail to perform his duty, or shall render a false or fraudulent statement of service alleged to have been performed, or shall fail to pay promptly the respective amounts due those who have rendered service, after said amounts have been transmitted to him, he shall be guilty of a misdemeanor, and upon conviction thereof shall be fined a sum not exceeding one hundred dollars, or undergo imprisonment not exceeding three months, or both, in the discretion of the court.

Section 1002. Penalty for Refusing to Aid a Fire Warden.—If any fire-warden, being in need of assistance in the suppression of fire, shall call upon any person to render assistance, and such person shall refuse without a just and fair excuse he is hereby declared to be guilty of a misdemeanor, and upon conviction thereof shall be sentenced to pay a fine not exceeding one hundred dollars, or undergo imprisonment not exceeding one month, or both, in the discretion of the court.

Section 1003. Penalty for Hindering an Officer in his Duties.—A person who shall prevent or obstruct, or attempt to prevent or obstruct, a fire-warden in the performance of a duty required by this act, or the exercise of the rights of entry, access, or examination by any warden or officer of this bureau, shall be guilty of a misdeameanor, and upon conviction thereof shall be sentenced to pay a fine not exceeding one hundred dollars, or undergo imprisonment not exceeding one month, or both, in the discretion of the court.

Section 1004. Penalty for Non-Abatement or Removal of Nuisance.—Every person or corporation refusing to comply with an order of the chief forest fire-warden for the abatement of a nuisance, under this act, shall be guilty of a misdemeanor, and upon conviction thereof shall be sentenced to pay a fine of not more than one hundred dollars, or undergo imprisonment not exceeding one month, or both, in the discretion of the court. In construing or enforcing the provisions respecting the abatement of nuisances, under this act, the neglect or refusal of any officer, agent, or other person acting for or employed by a corporation, and having within the scope of his employment the supervision of the property complained about, shall in every case be deemed to be the neglect or refusal of the corporation itself.

Every day's continuance in the non-abatement of a nuisance, after an order by the chief forest fire-warden to abate the same, shall be a separate and distinct offense.

If a preliminary injunction be granted or any interlocutory order of supersedeas intervene, no penalty shall be incurred on account of non-abatement of such nuisance for the period of time such injunction or supersedeas is in force.

Section 1005. Penalty for Causing Forest Fire.—Whenever a fire set by any person destroys property belonging to another, it shall be prima facie evidence that the loss occasioned is the result of negligence, and that the person responsible therefor is guilty of a misdemeanor. Upon conviction he shall be fined not exceeding one thousand dollars for each offense, or undergo imprisonment not exceeding six months, or both, in the discretion of the court. This section shall not apply to the setting of a back fire in good faith, to extinguish a fire then burning.

Section 1006. Every steam and electric railroad company, owning or operating lines of railroad within the State, which shall neglect or refuse to put into effect such reasonable regulations for the prevention of forest fire as may be deemed necessary by the chief forest fire-warden and approved by the Public Service Commission, shall forfeit and pay to the Commonwealth of Pennsylvania, for each neglect or refusal, the sum of one hundred dollars, to be recovered by an action of assumpsit, instituted in the name of the Commonwealth by the Attorney General in the court of common pleas of Dauphin County, which court is hereby clothed with exclusive jurisdiction throughout the Commonwealth to hear and determine such actions.

Every day's continuance in refusal to comply with such regulations, after a notice from the chief forest fire-warden and the lapse of a reasonable length of time for compliance therewith, which time shall be fixed in the notice, shall be a separate and distinct offense.

Section 1007. Disposition of Fines.—Moneys received from the payment of fines shall be paid to the treasurer of the county in which suit is brought, for the use of the county, except as otherwise provided in this act.

ARTICLE XI.

Section 1101. When, in the judgment of the Commissioner of Forestry, he deems it necessary for general forest protection that causes or agencies injurious to trees and forests, other than fire, be investigated, reported upon, or abated, he is hereby authorized to assign to the Bureau of Forest Protection persons competent for such work. The salaries of such persons, so assigned, shall be fixed by the Commissioner of Forestry, and shall in no case exceed the ordinary and usual amount paid for such services. Salaries and expenses shall be paid out of the general forest protection appropriation.

ARTICLE XII.

Section 1201. This act shall take effect June first, one thousand nine hundred and fifteen, or, if approved subsequent to that date, upon date of approval. All appropriations for forest fire protection which shall be made at the legislative session of one thousand nine hundred and fifteen shall be deemed to have been appropriated for general forest protection, and shall be expended for that purpose by the Department of Forestry.

ARTICLE XIII.

Repeal.

Section 1301. All acts or parts of acts inconsistent with or supplied by this act are repealed.

Approved—The 3d day of June, A. D. 1915.

MARTIN G. BRUMBAUGH.

REORGANIZATION OF FOREST FIRE WARDEN SYSTEM.

On September first, 1915, I began my duties under the new Act as Chief Forest Fire Warden, with Howard W. Siggins, clerk. Previous to that time, however, in connection with my duties as Forest Inspector, I had come into more or less close relation with the forest fire wardens and the forest fire business of the Department generally. In consequence of having handled the fire warden correspondence since about March, 1914, the defects of the old system of affairs were familiar to me and there were well under way plans for a partial reorganization under the old law of 1909, when the new law was approved.

The first work under the new law, necessarily, was that of reorganizing the forest fire wardens. Under the old act of 1909, wardens were to be appointed for township and boroughs. Most of the men upon our list had been appointed in the fall of 1909. Some few, however, were appointed in the last half of 1914 or in the spring of 1915. From the correspondence which was received during the past year, it was evident that in many regions where forest areas exist, there were no wardens; in other cases, there were wardens listed who never could be of use because there were no forests to protect. The old law provided that "district wardens" might have "assistants" to help them cover their townships, but in few instances were assistants appointed where needed, with the result, that wardens would gather up men and go as much as twelve miles or more from home to fight fire. Needless to state, by the time the fire was reached, it would be of considerable size and the expense of extinction would be large also. Some wardens had been incapacitated by reason of age, sickness, or accident. Some had moved out of the township, leaving no one to attend to the matter. Some did not keep in touch with the Department and were of the impression that their term of appointment had expired. Some simply refused "to bother" looking after fires. Some would not fight fire because several years back they had been notified of the exhaustion of one of the appropriations and they were afraid no money was available with which they or men whom they might hire would be paid. Some had died. Some were in occupations making it impossible for them to attend properly to their duties as forest fire warden. Only a few, apparently, made any sort of effort to let people know that they were wardens. Under such conditions, the wardens were not notified promptly of fires, with the result that many fires were allowed to reach large size before being attacked. Many wardens, evidently, have been indifferent as to the promptness with which they reached a fire, and in some cases men were appointed upon good recommendations who proved to be unfit for any position of trust and were not respected by the people of their communities.

Notwithstanding these defects which apparently could not be much improved under the old act, there were some notable exceptions of faithfulness on the part of our fire wardens, and, in such cases, fires were limited in size and fire bills were always small.

It was realized that these conditions would have to be remedied and in the fall of 1914 a beginning was made, with the co-operation of the foresters in charge of State Forests. However, it was not until the putting into operation of the Act of 1915 that real progress was made. On September 1st, the following circular was sent to all our foresters, a copy of the new act having been sent previously.

F. P. B. Circular, 1.

Harrisburg, Pa., September 1st, 1915.

Dear Sir: In order to facilitate the work of reorganizing the forest fire warden system each forester is requested:

1st. Make a rough sketch of the township or parts of townships in your immediate neighborhood in which there are now forest fire wardens or in which they are needed.

2nd. If possible, sketch in roughly the forest or waste land areas in need of protection.

3rd. Indicate as nearly as possible just where each forest fire warden lives, including the location of foresters and rangers.

4th. Draw a red line around the townships or parts of townships over which you can supervise the work of the forest fire wardens, and can audit their bills and reports quickly and conveniently to you and to the wardens.

5th. Make a report upon the present qualifications of all forest fire wardens within your knowledge and state reasons for retaining or dismissing them. Note the requirements of the new law. If you do not know the wardens, get to know as many of them as you can and learn about them from responsible people.

6th. Make recommendations for new appointments, indicating on the sketch in red ink the location and name of suggested men. If you think a certain locality should have a warden, but you can make no recommendations now, indicate the place with a red "x" on the sketch. Recommend only such men as you are reasonably sure you can trust and upon whom you can depend. Give their post office.

7th. The forest fire wardens, as far as possible, should be responsible men in a community. Every warden should have a telephone. We shall endeavor to make the organization as permanent as possible, consequently young men who are likely to remain in a community are to be preferred to men of 60 years or over.

8th. Even though you may have done some of the above work before, do so again at your earliest convenience so that the information may be complete and readily available.

9th. Give telephone numbers of wardens, including foresters and rangers, the name of the telephone company, and the central through which they are reached.

10th. Give post offices within your district from which rural routes start, and the names of the rural carriers.

If you do not have a township map available, make request upon this office and one will be mailed to you.

GEORGE H. WIRT,
Chief Forest Fire Warden.

When this circular was sent out, there were 1,589 forest fire wardens upon our list. There were also 152 foresters and rangers in the service of the Department who are ex-officio forest fire wardens, making a total of 1,741 men.

The foresters are located in twenty different counties, but can easily supervise the protective organization of at least thirty counties. Their reports began coming in promptly, with recommendations for re-appointments, dismissals, and new appointments. On October 1st, a copy of the following circular was sent to each fire warden in order to get first hand information from each one personally, as far as possible, and at the same time to place in his hands a copy of the new law.

F. P. B. Circular 2.

Harrisburg, Pa., October 1, 1915.

Dear Sir: The records of this Department show that you were appointed to serve the Commonwealth as a forest fire warden. Inclosed is a copy of a recent act of the Legislature providing for a reorganization of the forest fire warden system of the State. The reorganization must place the forest fire control work upon the highest possible plane of efficiency, for it is absolutely necessary that the loss from forest fires be reduced to a minimum. It is a great work and we must have honest service from every man. After reading the law carefully, furnish the information asked for on the inclosed form, and forward it in the inclosed stamped envelope.

If this matter is not attended to promptly, we shall assume that you are not interested and shall remove your name from our list.

Until you receive a notice of such removal of your name, or a card of certification of appointment under the new law, use the forms which you now have and carry out your duties in accordance with the old law.

Any question you may have with reference to the new law will be gladly answered.

Because of the small appropriation available, that part of Section 405 providing for an annual payment of ten dollars cannot be put into effect.

Your attention is called to Section 1001.

Any information relative to general forest fire conditions in your neighborhood, and suggestions as to fire prevention, will be gladly received.

Respectfully yours,

GEORGE H. WIRT,
Chief Forest Fire Warden.

With circular 2 was sent a copy of the following form which is a 5x8 inch blue card.

F. P. B. Form 2.

PENNSYLVANIA DEPARTMENT OF FORESTRY.

Name ....Post office ....

Township ....County ....

Do you desire to serve as a forest fire warden under the new law?..................

If not, can you recommend any one? Name..

Address..

Do you come within the qualifications as required by Section 401?..................

What is your age?..................What physical defects have you?..................

For reference give names and addresses of three responsible people.

....

....

....

What is your occupation?.....................By whom employed?....................

Do you hold any appointive or elective position?........If so, what?................

Do you have a telephone?........Name of telephone company, ...

Exchange through which you can be reached..................Telephone No.........

If you do not have a telephone, give name and number of nearest telephone through which you can be reached.

....

On the back of this form make a rough sketch of your township, showing where you live with reference to the nearest town, school house, or church. Give necessary names and distances for identification of your location.

On the same date, a copy of the following circular was sent to each forester.

F. P. B. Circular 4.

Harrisburg, Pa., Oct. 1, 1915.

Dear Sir: Inclosed is a copy of F. P. B. Circular 2, a copy of which has been sent to all forest fire wardens. Please fill out F. P. B. Form 2 for yourself and one for each ranger. Return these forms at once.

Under the new act, the former district and assistant fire wardens become local forest fire wardens and all are of equal rank. Each man must receive a certificate of appointment under the new act before its provisions become operative for him. After he has received his certificate, he is entitled to 30 cents per hour, unless employed as a patrolman, in which case he shall receive a monthly wage and shall not be paid extra for fire fighting unless by specific agreement.

Employees will be paid 15 cents per hour until further notice.

Destroy all old Forest Fire Bills. Use only new Form 16 providing for 30 cents per hour for fire wardens. Form 15 is to be used as it is.

See that all wardens who are to submit bills and reports to you use up-to-date forms. New copies will be mailed to each one as newly appointed.

You will be notified as to what wardens are to report to you and each warden will be so notified.

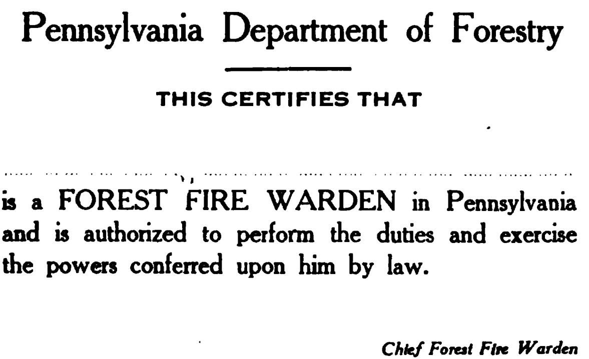
Please note that all bills must be in this office within 60 days after date of service. If presented after that time, they will not be paid. Keep your wardens posted on this point.

Encourage each warden to fill out Form 15 for each fire that comes to his notice, no matter how small, and even though there is no bill in connection with it. Bills for more than one fire may be combined under one affidavit. Save expense in this way whenever possible.

Yours truly,

GEORGE H. WIRT,
Chief Forest Fire Warden.

As rapidly as No. 2 forms were returned by a forester for himself or ranger, a certificate of appointment was issued to him. The certificate is in the form of a white card $3\frac{1}{2}$ x $2\frac{1}{4}$ inches and is known as F. P. B. Form 1.



Pennsylvania Department of Forestry

THIS CERTIFIES THAT

....

is a FOREST FIRE WARDEN in Pennsylvania
and is authorized to perform the duties and exercise
the powers conferred upon him by law.

Chief Forest Fire Warden

Across the face of the certificate was written in red ink: "Ex-officio." On the back of the card is printed: "Good until January 1, 1917, unless earlier revoked."

The various counties in which foresters are located were taken up in detail. The Department's correspondence relating to forest fires from January 1, 1913, and in some cases as far back as 1909, was arranged by counties. This was then gone over carefully to get whatever information might be of value in handling the county under consideration. Our old list of wardens was checked up and then a forester's report was considered. If an old warden were recommended, and he had returned Form 2, a certificate of appointment was sent to him, together with the following circular:

F. P. B. Circular 5.

Harrisburg, Pa., October 2, 1915.

Please note the following:

1. Inclosed is your certificate of appointment as a forest fire warden. This is to serve you in place of a badge.
2. All employes entitled to be paid for fighting forest fires will be paid 15 cents per hour until further notice. Hereafter you will receive 30 cents per hour.
3. All bills must be made up in time to get them to this office *within 60 days from date of service.*
4. You will submit all forest fire bills and reports to forester,
   , and be subject to his instructions relating to forest fires.
5. Under separate cover you will receive copies of Form 15, Forest Fire Reports; copies of Form 16, Forest Fire Bills.
6. Destroy all forms now in your possession not exactly like the ones now being sent you.
7. Make one report for each fire, no matter how small.
8. Bills for more than one fire may be placed upon Form 16 in order of date and totaled, *using one affidavit.*
9. Let every one know that you are a forest fire warden and ask them to notify you promptly in case of fire.
10. Get after forest fires as soon as they come to your notice.
    Do not delay one minute.
    Do not wait until night time.

Yours truly,

GEORGE H. WIRT,
Chief Forest Fire Warden.

In paragraph 4, there was inserted the name and address of the forester to whom the forest fire warden was to report. A letter was immediately sent to the forester notifying him of the appointment.

Many of the old wardens were prompt in returning their forms and expressed their desire to be relieved from duty. Their resignations were always accepted by letter, or by the following form mimeographed upon postal cards:

F. P. B. Form 4.

Dear Sir: Your statement that you no longer desire to serve as a forest fire warden has been received, and your resignation is accepted. Thanking you for your past assistance and trusting that we may still have your co-operation, I am,

Yours truly,

GEORGE H. WIRT,
Chief Forest Fire Warden.

When a former warden recommended any one as his successor, the recommendation in each case was first referred to the forester, and if the forester approved the recommendation, an offer of appointment was forwarded as in the case of recommendations for new appointments by the forester himself. In the case of all new recommendations, a copy of the following form is sent:

F. P. B. Form 3.

Dear Sir: You have been recommended as a man qualified to fill the position of Local Forest Fire Warden as required by Article IV of the inclosed act. Please read it carefully before filling up the accompanying form.

The prevention, control, and extinction of forest fires is of great importance to the Commonwealth. The State needs men who realize this fact and who will render honest and efficient service. The position is not one from which any amount of money can be obtained, but it is one in which a man may show a patriotic interest in his community and his State in an obscure way, at a reasonable wage while on duty.

Any questions you may have with reference to the law will be gladly answered.

Owing to a very small appropriation, that part of Section 405 providing for an annual salary of ten dollars cannot be put into effect.

Your attention is called to Section 1001.

Please return the form at your earliest convenience in the inclosed stamped envelope.

Yours truly,

GEORGE H. WIRT,
Chief Forest Fire Warden.

In this way, every man appointed under the new law has had the recommendation of one of our foresters and we are reasonably sure that we may expect efficient service with forest fires reduced in number and in extent.

Some few wardens have been instructed to report to Harrisburg, and to each of these a copy of Circular 5 was sent, inserting in paragraph 4, "Chief Forest Fire Warden, Harrisburg, Pa."

The following counties have no forest fire wardens at this time:

Beaver
Delaware
Erie
Greene
Philadelphia
Washington

The following 27 counties have been reported upon in part or entirely by foresters:

Adams
Bedford
Berks
Cameron
Carbon
Centre
Clearfield
Clinton
Cumberland
Elk
Franklin
Fulton
Huntingdon
Juniata
Lycoming
McKean
Mifflin
Monroe
Perry
Pike
Potter
Snyder
Somerset
Tioga
Union
Wayne
Westmoreland

Some of the men who have been recommended have not yet returned the No. 2 forms and in a number of places, good men must still be found. At the end of the year, 580 certificates of appointment had been issued. There have been about 200 resignations and dismissals. There were 137 new recommendations made, and of these, 73 have accepted and have been appointed.

CORRESPONDENCE.

During the last four months, in addition to the heavy correspondence relating to reorganization, the regular forest fire correspondence was taken care of. There was also some correspondence with forestry officials of various states as a result of the sending out of the following circular:

F. P. B. Circular 3.

Harrisburg, Pa., September 16, 1915.

Dear Sir: Inclosed is a copy of a recent act of the Legislature in regard to forest fires, under which this Department is now working.

We desire to be advised concerning the very best ideas covering the prevention, control, and extinction of forest fires, educational campaigns, equipment, etc. Will you, therefore, be kind enough to forward copies of all available literature, forms, and instructions which are found of value in your work? If you have any publications which you may not send free of cost, kindly state titles and cost.

Any suggestions with reference to your laws and activities, their valuable points or weak points, or concerning our law, will be received gladly.

If this Department is not on your mailing list will you kindly place it there, as well as my own name for individual copies of your publications? If my name is already upon your list with Mont Alto as my address, please change it to the address above.

Thanking you in advance, I am,

Yours truly,

GEORGE H. WIRT,
Chief Forest Fire Warden.

The material received from other States will be worked over early next year and a synopsis made of good ideas applicable to our conditions.

Forest Fire Bills.

On September 1st, there had been approved for payment from the deficiency appropriation to cover expenses for fires occurring previous to June 1st, 1915, $14,938.50. Since then, 19 bills have been approved amounting to $398.38, making the total expenditure from the deficiency appropriation $15,336.88.

On September 1st, there had been approved for payment from the appropriation to cover the expenses of forest protection between June 1st, 1915, and June 1st, 1917, bills amounting to $294.75. Since that time, there have been approved the following items:

107 bills for fire extinction,	$2,100 82
3 bills for patrol services,	450 50
4 bills for expenses of foresters while reorganizing fire wardens,	60 11
1 bill under co-operative agreement with associations,	46 85
Salary of Chief Forest Fire Warden, Sept., Oct., Nov., Dec.,	833 32
Expenses of Chief Forest Fire Warden,	13 46
Salary of clerk, Sept., Oct., Nov., Dec.,	300 00
Expenses of clerk,	4 04
Postage,	300 00
	$4,109 10

The total expenditure from the current appropriation at the close of December 31st was, therefore, $4,403.85.

Co-operation.

There can be no question but that forest fires will continue to devastate the forests and wild lands of this State until we can obtain a close co-operation between those who come into contact with such lands and those who are interested or should be interested in their development.

This co-operation naturally should begin with the officials of various parts of the State Government. It is folly for one branch of the government to be striving for a certain aim and for another branch to frustrate that aim by its activities, or even by its indifference to those problems in which it can help the State as a whole without any inconvenience, extra expense, or overlapping duties. The present Governor has recognized this fact and in repeated statements has instructed all State employes to co-operate with each other. The idea was crystallized in an act of the recent legislature "extending the powers and duties of foresters, forest rangers, game protectors, deputy game protectors, special deputy game protectors, fish wardens, and deputy fish wardens of this Commonwealth," making it the duty of each of these officials to enforce all laws relating to forestry, fish, and game. A mistaken notion of the duties of these various officials was responsible for the Act, no doubt, but it expresses in a crude way the desire for co-operation. In May, the Commissioner of Fisheries, and in July, the secretary of the Game Commission, issued letters of instructions to their men in regard to this Act, but to date, no definite statement relating to their assistance in the matter of forest fires has been issued. It is to be hoped that such a statement may be agreed upon in the near future.

However, the secretary of the Game Commission, who is charged with the publication of the Game, Fish, and Forestry laws, cooperated very effectively with this Department in regard to forest fires by having printed upon the back cover of the digest, the following:

Forest Fires in
Pennsylvania

MUST BE

Stopped

if you desire GAME, FISH, and FORESTS for the future

See Page 254

Page 253 of the pamphlet is the same as the above and page 254 follows:

STOP FOREST FIRES.

Forest fires are doing more to destroy the game, fish, and forests of Pennsylvania than any other influences.

Every one ought to do his share toward preventing the tremendous .economic loss which results from forest fires, and may help greatly by observing the following suggestions:

Be sure your match, cigarette, or cigar butt and pipe ashes are dead before throwing them away.

Build what fires must be used only upon bare soil and in such places that fire cannot spread.

Be sure your fire is extinguished before leaving it.

Burn no brush, or other material, near woodlands upon a windy day, and under all circumstances stay by the fire until it is dead.

Be as careful of fire in the woods as you are in your home.

Help extinguish a fire as soon as one is discovered. If you cannot help, notify the nearest fire warden, and if possible send a substitute.

Learn who your nearest fire warden is and give him your support.

In addition to this, in his Letter of Transmittal, the Secretary of the Game Commission calls attention to the serious results of forest fires and the necessity for their suppression. This digest is studied by those who frequent the woods and there can be no question but that the fire warning will be heeded by many.

The efficient help rendered us by the State Police cannot be commended too highly. These officers have not only prevented fires by their timely patrol service, but have been prompt in extinguishing fires that have come to their notice. They have also done good service in making investigations of facts relating to forest fires.

In November, the following correspondence was carried on between the Department of Forestry and the Highway Department:

November 9, 1915.

Hon. R. J. Cunningham, State Highway Commissioner, Harrisburg, Pa.

Dear Sir: There are three propositions in which this Department would like to have the co-operation of your Department.

The first matter is with reference to the posting of notices relating to the protection of forests from fire along State highways. In accordance with the in- and among them, forest fire posters put up by this Department. We believe that structions sent out to your officials, they have been removing notices of every kind the destruction of forests by fire renders unattractive the scenery along hundreds of miles of State highway and, since the Commonwealth is interested directly and indirectly in the preservation of forests, we believe that every Department should co-operate with us in helping to prevent these fires. The posting of these notices in forested regions along highways is one of the very best ways we know to attract the attention of the people to the necessity of preventing forest fires. We would, therefore, like to have an order to the effect that such notices may be posted along highways which run through forested regions.

Another matter which has come to our attention and which we believe can be remedied through your Department is the matter of supervisors brushing out their rights of way and then permitting the brush to lie along the side of the road and to become the source of forest fire. Our recent law makes it possible for us to declare such a condition of affairs on private land a public nuisance and when so declared, the private individual must abate it. As we understand it, all supervisors are now under the direction of your Department, therefore we believe that officials connected with the development of roads ought not to lay themselves open to blame along this line. We have received several letters complaining about this matter. We believe that at a very slight additional expense, and as we know from experience in some instances for less expense, the brush which is cut could be properly piled and burned, and in this way the rights of way could be kept clean and free from inflammable condition.

The third proposition is in the matter of getting the assistance of your patrolmen in reporting forest fires to our fire wardens. Your men are on the job all the time and are salaried men. Many of them have stretches of road to look after from which they can get wide views of adjoining territory. Unfortunately our appropriation does not permit of the employment of salaried men for the purpose of watching for forest fires. We do, however, have a system of fire wardens whose duty it is to extinguish fires as soon as they learn that fires exist. Your patrolmen can help in this matter simply by keeping their eyes open for forest fires in connection with their regular work, and then when they see them, by reporting them to our fire wardens. This arrangement would not take them from their work, will require very little of their time, and certainly will accomplish very much good and save the Commonwealth a considerable amount of money and the citizens of the Commonwealth a very great loss. We trust that we may have your co-operation in these matters.

Very truly yours,

ROBERT S. CONKLIN,
Commissioner of Forestry.

November 11, 1915.

Hon. Robert S. Conklin, Commissioner of Forestry, Harrisburg, Pa.

Dear Sir: I wish to acknowledge receipt of yours of the 9th instant addressed to the Commissioner, which has been referred to me, relative to the co-operation of this Department with the Forestry Division. In reply thereto would say that it will afford us pleasure to co-operate with your Department in every way possible, and in compliance with your request we are this day issuing a circular letter to our various District Engineers covering the points mentioned. I would be glad to have you call my attention at any time you should hear of any failure on the part of our assistants in co-operating with you.

With kindest personal regards, I am,

Very truly yours,

W. D. UHLER,
Chief Engineer.

November 11, 1915.

To Engineers:

Dear Sir: Complaint has been received from the Commissioner of Forestry that Forest Fire Posters have been removed by our forces. Please notify your superintendents and foremen that any signs posted by the Department of Forestry, with reference to forest fires, et cetera, should not be removed.

It is also requested that in brushing out along the roadside, the brush be properly piled and burned, in order to eliminate the source of many forest fires.

In this connection, you will also instruct your patrolmen to report to the Fire Wardens in their vicinity any forest fires they may observe.

Very truly yours,

W. D. UHLER,
Chief Engineer.

We have every reason to believe that such co-operation is going to result in a material saving of direct expense to the Commonwealth.

During the year 1915. this Department has been co-operating with the Pocono Protective Fire Association in Monroe county through our District Forester, John L. Strobeck. His report, so far as it relates to forest fires, is herewith presented.

REPORT OF DISTRICT FORESTER FOR MONROE COUNTY, 1915.

The spring fire season of the year 1915 was an unusually severe one. The month of April presented weather conditions favorable to devastation by fire by reason of prolonged high and drying winds and low precipitation. The dangerous period of time was rather short, owing to frequent rains during the month of May, but the fires which were most destructive originated at unprotected places, and at times when weather conditions were most favorable to their progress.

On Sunday, April 18th, after the forests had been exposed to high and drying winds for a number of days, a fire was detected from the forester's headquarters in the thinly populated part of eastern Barrett township. Immediate response was made to the call, but between 11:30 A. M., at which time it was first detected, and 4 P. M., the fire was carried in a direct course of five miles.

This was the most destructive fire of the year, covering an area of about 2,500 acres in Monroe County, and possibly 1,000 acres in Pike County. However, no timber of any commercial consequence burned, but destruction of the young growth of sprouts and saplings ranging from 4 to 12 years in age, the death of the small game, and refuge destroyed for that which survived, the humus destroyed, the very direct loss incurred by the owner of a house which burned, and by the Commonwealth of Pennsylvania which lost 20,000 pine and spruce trees in plantation form on State land, besides the cost of extinguishing the fire which amounted to $377.68,—this is the toll exacted by a little carelessness no doubt on the part of some person who did, or proposed to do some illegal fishing.

Following is the estimated acreage by townships burned over in Monroe county during the spring of 1915:

Barrett township,	3,852¼ acres
Coolbaugh township,	188½ acres
Chestnuthill township,	150 acres
Hamilton township,	548 acres
Middle Smithfield,	302 acres
Paradise township,	22¾ acres
Pocono township,	257½ acres
Price township,	2,000 acres
Smithfield township,	360 acres
Stroud township,	35 acres
Tunkhannock township,	5,335 acres
Total,	13,051 acres

Of the 37 fires which originated in the county, the following are or are believed to be the causes:

D. L. & W. Railroad,	10
Neglected camp fires,	2
Steam roller (hot coals),	1
Fisherman,	2
Wilkes-Barre & Eastern Railroad,	4
Brush burning,	2
Sawmill,	1
Pasture burning,	2
Lighted cigar,	1
Unknown,	12

Tunkhannock township suffered to be burned the largest acreage, although the greater part of this area is what is known as "huckleberry grounds." If it is possible to regulate these "huckleberry burnings" by the aid of existing laws relating to the prevention and control of fires, it should be done at the earliest possible time. The harvesting of huckleberries is a legitimate business and should be encouraged on such lands which are suitable and where it may be made a paying proposition, but at that point where the business abuses the rights and privileges of adjoining land owners, there regulation should begin.

There were 12 fires, the causes of which are listed by fire wardens as "unknown." Undoubtedly, a number of these may be attributed to the huckleberry business. It is very seldom that a person can be detected in a definite way who sets fire to huckleberry grounds. In justice to the owners, it may be said that they are rarely the cause of the fires being started. It is understood that it is usually done by individuals who desire the work or the opportunity to pick berries for the market.

Regulation could, no doubt, be effected under Duty of Chief Fire Warden (n) and (o), Section 102, Article I of the act establishing a Bureau of Forest Protection. An area held for the purpose of harvesting huckleberries and known as a place where fires originate, and where there is no attempt on the part of the owner to prevent the fire from communicating with adjoining lands, could, no doubt, be adjudged a public nuisance. The owner could then be advised to burn his area at such times as is necessary, and with sufficient help to prevent fires from communicating with adjoining lands. He should also be advised to keep a patrolman on his huckleberry lands during dry periods of the year when there is an accumulation of leaf litter, dry weeds, etc., all highly inflammable.

This would make no large expense to the owner, since patrol would be required about four months only for every three years' rotation, or, a co-operative plan of some form probably would meet the condition. Regulation with regard to fire protection should not discriminate between lands leased for huckleberry harvesting or lands used for the purpose by the public free of charge.

A disproportionate number of causes of fires are attributed to the D. L. & W. Railroad. Nearly the entire number of these fires were small and were caught in their incipiency. Four fires are attributed to the Wilkes-Barre and Eastern Railroad.

The railroads with rights of way through Monroe county cause more fires than any other agency. But it must also be remembered that this enterprise is fraught with more accidental setting of fires than any other agency through which fires originate. The D. L. & W. Railroad keeps its right of way comparatively free of inflammable material, but as much cannot be said of the Wilkes-Barre and Eastern Railroad. However, the railroad managements are in sympathy with the matter of fire protection and extend the aid of their section men whenever it lies within their power to help, and whenever a request for their help is feasible. I would again press to your notice, as in a former report, that a patrol maintained by the railroad managements along their rights of way is the only feasible manner in which the loss from forest fires caused by the railroads can be reduced.

The amounts paid by the State for Monroe county, as expense incurred for fire protection and extinguishment during the spring season are as follows:

Extinguishment of fires,	$747 98
Patrolmen's salaries,	300 50
	$1,048 48

One of the patrolmen was located in Wayne county, although a considerable part of his patrol region extended into Monroe county.

The Department of Forestry continued in co-operation with the Pocono Protective Fire Association in the matter of maintaining patrol service for the county. While the Department expended $25.00 per month each for the seven patrolmen employed for the first month of the spring season, and the same amount for each of six patrolmen for the second month, the Pocono Protective Fire Association supplemented the salaries of three patrolmen to the extent of $25.00 each per month, while in case of two additional patrolmen, $25.00 per month additional was paid each of them by Mr. Henry S. Cattel and Mr. Norman Hoffman. The remaining two patrolmen for the first month and the remaining one patrolman for the second month served at the rate of $25.00 per month.

Although the fire season was unusually severe, yet the patrolmen extinguished nine fires with no other help, by catching the fires in their incipiency. In case of a fire of any consequence, the patrolman has always been found to take prompt measures to extinguish it, and with a few trivial exceptions, has done this work well.

A few changes in the personnel of the fire wardens were made during the spring. Efforts are being made to have only such men occupy the office who are capable and who will attend to the duties of the office irrespective of their daily vocations. We may expect frequent changes, since the office is one which a man must consider secondary to his ordinary way of gaining a livelihood. However, the grade of men who are fire wardens in Monroe county runs high, due to the interest which has been aroused in the matter of fire protection.

The second annual dinner was given to the fire wardens under the auspices of the Pocono Protective Fire Association at Buck Hill Falls Inn on the 20th of April. Twenty-three out of a possible thirty wardens were present. Mr. Geo. H. Wirt represented the Department of Forestry at this meeting, and the occasion was one of enlightenment in the matter of law, the routine which is necessary to handle the system, general intelligence regarding the objects for which the association is striving, and the duties incident to the office of fire warden.

The meeting was held at Buck Hill through the courtesy of Mr. Thompson, manager of the Buck Hill Falls Company, who is a director of the association. As an instance of his interest in the work, he obligated himself a host to the gathering. For the success of the meeting, Dr. Wm. R. Fisher, Secretary of the association, handled arrangements in his usual efficient and thorough manner.

At a meeting of the Directors of the Pocono Protective Fire Association held in March, it was directed that the secretary confer with the district forester in the matter of devising a poster on which shall appear the names and addresses of the fire wardens of the county; also a poster of a precautionary nature relative to the setting of fires. In accordance with these instructions, we prepared a cloth poster, on which about one-half of the space was left blank. In this space I inserted with rubber type the names of the fire wardens of a given locality. About 400 of these posters were prepared during the summer for the various districts of the county, and with the aid of the patrolmen and a few wardens, practically the entire county was posted. These posters are giving entire satisfaction with the exception of the quality of ink used.

The other poster was made of card board, and about 900 were placed along with the others.

Permission was obtained from the State Highway Commissioner to tack the posters along State Highways. A copy of the correspondence is on file in your office. This was a concession of considerable advantage, since the absence of advertising matter made the posters all the more conspicuous. And besides, it determined the legal status of issuing and placing before the public, information and educational matter prepared by the Association.

The posters were distributed in anticipation of the fall fire season.

During the early part of September, I was instructed by the Chief Forest Fire Warden to reorganize the fire warden system in Monroe county, and such parts of Pike, Wayne, Lackawanna, and Carbon counties as directly affect our work in Monroe county, so as to conform to the provisions of the new Forest Protection Code.

The reorganization in Monroe county and preparation for the fall fire season were begun at the same time. At the present time, there remains one warden who has not received his certificate of appointment under the new law. Before the end of the year, the system will be completely reorganized in Monroe county.

The fire wardens and assistants under the old law were given preference in reorganizing, and were offered the position of local warden. When a vacancy occurred, I recommended an appointment, subject to the approval of the secretary of the Pocono Protective Fire Association.

Instructions were received from the Chief Forest Fire Warden that he will expend out of the fund set apart for fire protection, $25.00 per month for the employment of six patrolmen as long as their services are required for the fall fire season. The same arrangement for their employment was made with the Pocono Protective Fire Association and with individuals as was made in the spring. The patrol at South Sterling, Wayne county was discontinued and an appointment was made for the Long Pond region.

The patrol service was maintained for a period of two months. Conditions favorable to forest fires were present at frequent intervals during the entire fall season; but no long periods of dry weather prevailed as during the spring season. Consequently, only three fires occurred, and one of these was rather in the nature of prevention than of extinction. On the night the Water Gap House was destroyed by fire, patrolman Wallace deemed it expedient to take proper precaution by employing a sufficient number of men to extinguish fires due to flying embers, as they started in the woods from time to time.

The following is a summary of the fires which occurred during the fall season:

Number of fires,	3
Estimated number of acres burned,	4½
Number of fires extinguished by patrolmen with no extra help,	1
Cost of patrol service to State,	$300 50
Cost of fire extinguishment (fire bills),	28 10
Total cost of fire protection for fall of 1915,	$328 60

Causes:

D. L. & W. R. R.,	1
Wilkes-Barre & Eastern R. R.,	1
Burning building,	1

The following is a summary of fires which occurred in Monroe county during the year 1915:

Number of fires reported,	40
Estimated number of acres burned,	13,055¼
Total cost of extinguishment (fire bills),	$747 98
Cost of patrol service,	601 00
Total cost of fire protection to Department (not including District Forester's salary and expenses),	$1,348 98

Causes of fires during the year 1915 in Monroe county:

D. L. & W. R. R.,	11
Neglected camp fires,	2
Steam roller (hot coals),	1
Fisherman,	2
Wilkes-Barre & Eastern R. R.,	5
Brush burning,	2
Sawmill,	1
Pasture burning,	2
Lighted cigars,	1
Burning building,	1
Unknown,	12

The total amount expended by the Department of Forestry and the Pocono Protective Fire Association under the existing co-operative agreement (District Forester's salary and expenses excepted) is as follows:

Department of Forestry, fire bills and patrolmen's salaries, ..		$1,348 98
Pocono Protective Fire Association, patrolmen's salaries:		
From treasury, ...	$319 88	
Paid by individuals, ...	200 00	
		519 88
		$1,868 86

The annual report of the secretary of the Pocono Protective Fire Association is attached hereto. It will show that expenses other than for patrol service have been met by the association to the extent of $183.18. Thus, the amount expended by the Department of Forestry for the county of Monroe in the matter of forest fire protection and the Pocono Protective Fire Association, the only other authorized agent, other than individuals, in the county with funds to expend for the purpose, will total $2,052.04.

Our patrol system has attained that state of usefulness during its two and one-half year's work which should guarantee its permanency. The Pocono Protective Fire Association considers the patrol system to be its chief burden of maintenance and the greatest factor in its tangible work.

The position of patrolman has attained that prominence in Monroe county where it is regarded as a position of public trust. Complaints relative to patrolmen are common, but this fact is evidence of a public interested in the matter of protection. The patrolman's position is one to which people of the forested regions are now looking for results.

The cost of extinguishing fires amounted to almost $150 in excess of the cost of patrol service to the State. It is a reasonable proposition that if a patrolman had been stationed in that region of Barrett township where the fire started on April 18th and cost $377.68 to extinguish, the fire might not have originated, or, at least, would not have been so difficult to suppress.

Practically the same conditions existed in connection with nearly all the large fires. My observation and experience point to the fact that the farther the patrol service is extended in Monroe and adjoining counties, by so much the more will the expenses and loss incident to forest fires be reduced.

During the month of May, patrolman Shaller, stationed at Mount Pocono, opened a subscription for the purpose of building a look-out to increase the range of vision over the outlying regions. The boarding house proprietors readily subscribed the amount necessary for its erection. While serving as a fire observation tower for the patrolman, at the same time the guests at the various inns will see in it an added attraction in the way of affording a view of the surrounding country.

I made plans and specifications for its erection, and helped to erect it. At this time, I desire to commend the aggressiveness and industry of our patrolman at Mount Pocono, through whose activity the proposed look-out became an actuality. A small deficit was met by the Pocono Protective Fire Association, and the look-out became its property on completion.

Patrolman Primrose built a look-out at Resica which serves the purpose of viewing the outlying regions. This look-out also became the property of the Pocono Protective Fire Association because of its erection by an employee under the co-operative agreement. Both look-outs are rustic wooden structures.

During the fall of the year, Mr. J. A. Seguine, of Cresco, a director of the Pocono Protective Fire Association, obligated himself to the task of raising a fund for the erection of a look-out tower on Cresco Heights, to be used as an observation station by the patrolman in the Cresco region, provided I make plans and specifications and superintend its erection. With little difficulty, Mr. Seguine raised a sufficient amount to cover expenses. The boarding house proprietors were willing to subscribe, for the reason that a look-out at this point would be an attraction to their patrons. Since the look-out is erected, their views are amply justified in consideration of the number of people who climb the mountain to see the surrounding country from its height. Two loads of round poles were furnished free of charge from State land.

The look-out tower is built of round timber, concreted in the ground, and has three platforms and winding stairs. My plans and specifications were followed throughout its construction, and patrolman Wilson had charge of the work.

The reorganization of the fire warden system proceeded rather slowly in counties other than Monroe, owing to the press of other matters. However, parts of Wayne, Lackawanna, Carbon, and Luzerne were visited, and in every case where I made recommendation of an appointment, the person recommended was first interviewed personally. The men serving under the old law were given preference in the matter of recommendation for the position under the new; but lack of interest was especially noted, and in a certain few cases, the men had actually forgotten that they were fire wardens. In some cases, hotel proprietors held the office, which was not conducive to the best interests of the work. Others were poorly districted. Dissatisfaction was evident in many instances concerning pay for fighting previous fires, due principally to ignorance as regards the routine through which the business is conducted.

Thirty recommendations were made for the counties other than Monroe for release, appointment, and retention of certain men. Of course, many more were interviewed.

It is hoped that when the spring fire season opens, these counties will be completely reorganized, and that direct supervision of the work will result in a very much more capable and efficient personnel.

It is not necessary at this time to dwell upon the importance of adequate facilities for the prosecution of this work of reorganization. I know that the lack of the necessary funds is responsible for the lack of convenience. It is to be hoped that the means will be at hand before long so that suitable office equipment can be obtained, proper transportation facilities may be had, and experimental work carried on to a certain extent. My transportation was obtained at a personal loss, since my allowance was not sufficiently large to cover expenses incident to the operation of an automobile.

If my office is to be headquarters for this reorganization, there is much need for an assistant next spring so that the work on the State Forest does not suffer. The personnel of the State Forest staff is such that nothing in the way of management can be expected of them.

As regards the matter of reorganization, it is suggested that F. P. B. Form 2 be placed in the hands of the District Forester who shall see to the matter of their being returned to the Chief Forest Fire Warden, duly filled out. This would relieve a source of misunderstanding and delay in many instances.

This report brings out clearly the value of observation towers and patrolmen. Prevention surely pays better than mere extinction and it is along the lines of prevention that our activities must be more earnestly directed.

That the idea of prevention is taking hold of the people as a result of our work in Monroe county is evidenced from the following statement in a letter from one of the patrolmen.

> "I am opening many roads and fire lines on the eight thousand acres of private land of which I have charge. As our service was of so much good, the property owners are begging to assist in the way of opening roads and lines. We also have the use of several towers."

The forest fire work of R. Lynn Emerick as District Forester for Potter county was mostly confined to an educational campaign and a partial reorganization of the fire wardens. In townships where no fire wardens were located, capable men were recommended for the position. Practically every fire warden was interviewed and instructed in the proper manner of filling out the bills and reports. They were also strongly urged to get out to fires immediately and not to wait until they had burned several hours.

A list of the wardens with their addresses and telephone numbers was widely circulated throughout the county. Over two hundred and fifty fire notices were posted in prominent places, such as stores, blacksmith shops, railroad stations, and on any public place where permission was granted to place them. The fire stickers were distributed to merchants and placed on ammunition boxes and fishing tackle. It appears that the spring is the most severe fire season in this county.

In northern Centre county, the Central Pennsylvania Forest Fire Protective Association is operating with headquarters at Snow Shoe. One of our State foresters, George W. Sheeler, is its secretary, and in addition to his work on the Snow Shoe State Forest, looks after the fire protective work of this association. This Department paid to the Association during the year $225.50 for patrolmen and $46.85 for other purposes.

The region covered by the association is a difficult one to protect because of its few inhabitants and the lack of facilities for rapid communication. But, as its objects and activities are better understood, better results are being accomplished. Only a few of the timber land owners within the region are members of the association, with the result that much non-association land must be protected in order to protect association land. This is unfair and some means must be found whereby those who desire to protect themselves must not be made to bear the expense of protecting the land of careless and indifferent owners.

Mr. Sheeler reports as follows:

"GENERAL SURVEY OF THE FIRE SEASON.—The spring weather conditions were not favorable to a campaign against forest fire, unusually dry and strong winds blowing most of the time. This was the condition of the weather for 22 days during the month of April. Nearly all the fires occurred during this time. However, through such an unfavorable period the association withstood the trying ordeal, stopping many small fires and controlling and even extinguishing large ones that might have proved wide spread, raging conflagrations of forest land in this vicinity. The arduous task the wardens and patrolmen had before them at this time and their persevering efforts have been very favorably commented upon. The fall weather conditions were not so dangerous as those of the spring season, hence no fire of consequence occurred. With the exception of the several fires originating from the careless burning of the N. Y. C. R. R. right of way, the efficiency of this association under such tests as it has been put to this last year has proved successful.

"PATROL WORK.—Eleven patrolmen were employed to keep watch during the spring and fall fire seasons. Patrol duty extended for a period of one month, patrolmen receiving for their services $25.00 per month. Four small fires were extinguished by these patrolmen while on duty. Besides the above patrol, fourteen fire wardens and one forest ranger assisted in the work of extinguishing forest fire. The results accomplished by this system were 43 fires extinguished, one fire scare, and two fires attended but not included in association confines. By the activities directed along this line, forest fires have decreased in number, the cost per acre for extinguishment has decreased proportionately, and there has been a reduction of area covered per fire.

"PERMANENT IMPROVEMENTS.—The telephone line from Snow Shoe to Spruce Run has been completed. This extends over a distance of 8.5 miles. Two more telephones were hung on the line this year, making four in all.

"About 95 miles of old roads used by the lumbermen at one time have been mowed out and kept up. The purposes of these are to afford easy and quick access into the area and a barrier to an approaching fire. We need more roads of this type for they are absolutely essential to the efficiency of association work.

"PUBLICITY.—On March 31st, 1915, at Snow Shoe, Hon. S. B. Elliott, member of the Forestry Reservation Commission of Pennsylvania, delivered an address on Forestry before a large and enthusiastic audience. He pointed out the immediate needs for forest fire prevention in this area. He also advocated the planting up of many existing areas where there is no desirable growth present and none in sight. He showed that planting was a good business investment.

"Warning posters were placed in conspicuous places all over this area. Wherever conditions for forest fires existed, such as sawmills, camps, dinkey roads, railroads, etc., the owners or managers of these were notified separately about the possibilities of forest fires and how easy it is for them to control them. As a result of these notifications, many fires formerly due to these sources have been eliminated.

"Forestry talks at public and private gatherings and articles for the county newspapers were used to bring attention to existing conditions. A campaign by mail for membership was instituted. The results have been gratifying but it behooves every land owner in this area who is not already a member to become one at once. For it is to be remembered that fire prevention is good insurance, insurance is foresighted business, forsighted business is established on what has and can happen. Thus we see forest fire prevention is foresighted business. Its value is shown in accumulated forest growth, and many benefits resulting therefrom.

"CO-OPERATION.—Many fires have originated along the right of way of the railroads in this territory. They are due to carelessness on the part of the employees, injured spark arresters, and indirectly to the heavy grades on roads across the area. The N. Y. C. R. R., by the request of the association, has burned along their right of way a strip about 300 feet wide, for a distance of 26 miles. Barring the irresponsible labor for an operation of this kind, the idea is a splendid one. However, the railroad, in the future, must guarantee a safe burning if the intended good is to be realized.

"By request from individuals, information concerning trees, forests, and their particular problems was furnished free.

"FOREST FIRES.—Forty-three fires occurred on this area in the year 1915. In an effort to find the real cause for these fires, we have divided them into three classes:

1. Carelessness (unintentional).		2. Intentional.	
Railroads,	13	Set for pasture,	3
Clearing land,	5	Spitework,	2
Dinkey,	2	Purposely by tramp,	1
Hunters,	3		
Fishermen,	2		
Smoking,	3	3. Unknown,	4
Other causes,	3		
Old coal mine,	2		

"SUMMARY OF THE WORK ACCOMPLISHED.—

1. Greater efficiency in the work of the association.
    a. Decrease in number of fires.
    b. Decrease in cost per acre extinction.
    c. Decrease in area per fire.
2. Patrol work more efficient.
3. Warden work more efficient.
4. Telephone line completed. Two more telephones added.
5. Ninety-five miles of old roads were worked on.
6. Greater efforts in publicity were made. A systematic distribution of forest literature.
7. Co-operation with railroads and individuals. Twenty-six miles of railroad right of way burned.
8. Increase 10 per cent. in membership.

In Berks county, we have co-operated with the Berks County Conservation Association and in the spring of 1915, paid out $120.25 for patrolmen. The secretary of the association looked after the forest fire matters generally within the county, and as a result, we believe that the loss from fires was materially reduced.

During the year, efforts have been started towards protective associations in Clinton county and northern Dauphin county.

In a number of places, our foresters and fire wardens have been able this year to co-operate with railroad officials, or to bring about co-operation between land owners and railroad officials so that miles of fire breaks have been burned along railroad rights of way. One very notable example of this work was accomplished in Centre county along the Bellefonte Central Railroad. The following agreement was drawn up and signed by seven owners of land along the right of way:

State College, Pa., October 11, 1915.

To insure better protection from forest fires, which annually destroy thousands of dollars worth of timber and property in Pennsylvania, we, the undersigned owners of timber and woodland adjacent to the right of way of the Bellefonte Central Railroad in the territory known locally in Centre county as "The Barrens," hereby grant permission to the said Bellefonte Central Railroad Company to burn over such a strip of our woodlands adjacent to its right of way as will make a distance of 100 feet on each side of the centre of the said railway track; such a strip to be burned over by the said Railroad Company in the spring and fall of each year when the danger from forest fires is greatest or oftener when the danger from forest fires is such that the State Department of Forestry shall order the said strip to be burned over; it being further understood that this permission is granted for a period of ten years from the date hereof and that the said railroad company will use all care in the burning over of such a strip so as not to endanger the adjacent woodlands, or destroy any fences or other property not belonging to the said railroad company.

We find that most of the railroad companies are willing to do their share in thus preventing fires but that private individuals will do nothing themselves and will not grant permission to the companies to do anything toward making a safety belt along the dangerous stretches of track.

The following agreement was entered into between the President of State College and the Department of Forestry through our forester, Mr. Ludwig:

State College, Pa., October 14, 1915.

To aid in the suppression and extinction of forest fires, the Pennsylvania State College through its Forestry Department will co-operate with the Pennsylvania Department of Forestry along the following general lines:

1. When the men engaged in extinguishing local forest fires, either upon the State Forests or private woodlands, are unable to get the fire under control, the Fire Warden in charge will call upon the Professor of Forestry of the Pennsylvania State College for assistance, it being understood that the Fire Warden will first summon the available men in the vicinity of the fire and only send such a call for assistance when this local force is unable to control the fire. The Professor of Forestry will then, according to his judgment, call out as many of the forestry students as are desired and available, and place them under the direction of the local Fire Warden.

2. Forestry students assigned to such work will be excused from classes and other college exercises for a reasonable period and will receive credit for such absence. Other students will not be so excused.

3. No remuneration for labor services will be given but the Pennsylvania Department of Forestry will make arrangements for conveyances and provisions.

The Pennsylvania State College,

EDWIN E. SPARKS,
President.

The Pennsylvania Department of Forestry,

WALTER D. LUDWIG,
Forester.

For several years, a number of the railroads have been co-operating with us in posting forest fire warnings on their bulletin boards, and printing forest fire warnings upon their schedules and upon other printed material. The Pennsylvania Railroad Company has just issued a small card giving instructions upon the Method of Piling Cross-ties for Inspection and on the back of the card is printed the following:

TO PREVENT FOREST FIRES.

Please do not be any less careful with fire in or near the woods than you are with fire in your own barn, home, mill, or office. Nor loaf when you discover a fire in the woods; if you can't put it out yourself, get help promptly. Where a forest guard, ranger, or fire warden can be reached, get word to him.

Please do not throw your match, cigar or cigarette away until you are sure it is out. Nor knock your pipe ashes while hot out of car windows or where they will fall onto dry leaves or other inflammable material.

Please do not fail to get a permit from a warden or a property owner wherever one is required by law before bush or camp fires may be built. Nor use fire in or near the woods unless absolutely necessary. Never build a fire any larger than is absolutely necessary.

Please do not burn brush or refuse when the wind is high or the woods dry enough to burn. Nor build a camp fire against a log, a stump, or a tree, or anywhere but on bare soil. Never leave a fire until you are sure it is out; if necessary smother it with earth or water.

Please do not forget that thoughtlessness and negligence cause more than half the forest fires, and that the smallest spark may start a conflagration that will result in loss of life and destruction of timber and young growth valuable not only for lumber but for their influence in helping to prevent flood, erosion, and drought, and to preserve wild life.

Most of the railroads have issued very definite instructions to their men with reference to being careful not to cause forest fires and to extinguish them when within a reasonable distance of the right of way. The unfortunate circumstances are, however, that the enforcement of such regulations is very lax upon some divisions because of a lack of interest on the part of those officials entrusted with this enforcement. Where the various local officials can be interested in forest protection, there is little trouble with railroad fires.

In many other directions, our foresters and fire wardens are accomplishing good results by co-operating with private individuals, water companies, lumber companies, and so on.

The support which we have been receiving during the past year from the sportsmen of Pennsylvania is worthy of note. In several counties, the local organizations have had printed at their own expense, and distributed, a number of forest fire posters.

The Blair county organization has been particularly active in this direction, having placed about 500 cloth posters upon which was printed:

NOTICE!

FOREST FIRES!

Please help to preserve our forests by being careful with fire in the woods. If you see a small fire, put it out! Watch your pipe, cigar and cigarette ashes. Put your camp fire out! Large fires are small ones neglected. Every citizen of Blair County should be vitally interested in the preservation of our forests.

In addition to being a source of lumber, our forests are necessary as protection to our water supply, our game, our fish, and our song and insectivorous birds. Who wants to see Blair County barren of trees? We don't! If you see fire that you can't put out, notify the nearest State Fire Warden. If you can't locate the Fire Warden, call up the Blair County Game, Fish and Forestry Association, John H. Winters, President, 1609 Eleventh Avenue, Bell Phone 250, Altoona, Pa.

In the little booklet containing the constitution and by-laws of the Association, and upon other printed matter, there is direct reference to forest fires and the necessity for their prevention and suppression.

The Press of the State, generally, is willing to co-operate with us in educating the citizens about forest fires and are simply waiting for material to print. In many parts of the State this past fall, they have been very glad to publish lists of forest fire wardens for the benefit of their patrons as well as other material relating to forest fires.

A field for co-operation which has not been taken advantage of as yet, but which will be used as soon as the list of wardens is published, is authorized in the following order and letter issued to postmasters by Postmaster General Burleson.

POST OFFICE DEPARTMENT.

Washington, D. C., July 12, 1915.

The attention of postmasters and rural and star route carriers is directed to the following order, which should be carefully observed:

ORDER NO. 9006:

The following instructions are promulgated for the guidance of the postal employees concerned:

In accordance with the request of the Secretary of Agriculture, this Department has arranged a plan of co-operation with the State and National Forest officers whereby rural and star route carriers shall report forest fires discovered by them along their route to persons designated by the State and National authorities to receive such intelligence.

Co-operation with State officers will be given in all States which have established by law a system of forest fire protection.

Co-operation will be furnished National Forest officers in all states containing National Forests.

The State and National authorities will inform postmasters as to whom the discovery of fires should be reported, and each rural carrier should be directed to co-operate to the fullest extent with such authorities in the manner agreed upon, namely, that the carrier shall report a fire to the nearest State fire warden or National Forest officer on his route, or, if no such warden or officer lives on the route, to arrange through some responsible citizen to have him notified, by telephone if possible. Star route contractors and carriers are included in the plan of co-operation and should be requested to report the discovery of fires in the same manner as will be done by the rural carriers.

Postmasters in or near National Forests are also directed to report fires to the nearest forest officer.

A. S. BURLESON,
Postmaster General.

(This order was published in the August supplement to the Official Postal Guide, page 2.)

OFFICE OF THE POSTMASTER GENERAL.

Washington, D. C., September 7, 1915.

Hon. D. F. Houston, Secretary of Aigriculture.

My dear Mr. Houston: In response to the request made in your letter of the 27th ultimo, I am inclosing a letter, copies of which may be used by Federal or State forest officers in transmitting to postmasters warning notices relative to forest fires.

Very truly yours,

A. S. BURLESON.

OFFICE OF THE POSTMASTER GENERAL.

Washington, D. C., September 7, 1915.

Postmaster: This Department will approve of your having the accompanying notice, relative to forest fires, posted in a conspicuous place in the lobby of your office.

If your office is located in a government building you should submit promptly to the Secretary of the Treasury your request for authority to place the notice in the lobby.

A. S. BURLESON,
Postmaster General.

The co-operation which must be had with our citizens and which may be had with some effort is well set forth in a report submitted by forester V. M. Bearer upon a protection system which he found to have been organized in western Pennsylvania by forest fire warden, E. C. Myers, of Mount Pleasant.

"The region covered includes Mount Pleasant borough and Mount Pleasant township, Westmoreland county, and Bullskin township of Fayette county. It is divided into ten so called "districts," with definite limits, as follows:

Westmoreland County:

District No. 1. Between County Line Road and Stone Pike.
District No. 2. Between Stone Pike and Jacobs Creek.
District No. 3. Between Jacobs Creek and the Snyder Road.
District No. 4. Between Snyder Road and Clay Pike.
District No. 5. Between the Clay Pike and Bear Rock Road.
District No. 6. Between Bear Rock Road and Mike Johnson Road.
District No. 7. Between Mike Johnson Road and Catholic Church Road.

Fayette County.

District No. 1. Between the County Line and Greenlick.
District No. 2. Between Greenlick and Mounts Creek.
District No. 3. Between Mounts Creek and Stauffer Road.

Several "Fire Companies" of ten to fifteen men, including a captain, are formed. Each of these companies keeps strict watch for fires in the one or two districts which are assigned to it and immediately upon discovery of a fire they set out to combat it. The various companies co-operate and unite their forces when necessary, as in case of a wide spreading fire with a prevailing high wind.

Though other companies are quick to offer assistance to the one engaged in combating forest fires, usually the fire is under control by the time they arrive. This immediate control of fires is effected through the several companies of "Minute Men," as it were, who are ever ready and prepared to respond to the call of fire. They are so distributed over the locality as to bring every point within easy reach of at least one company. Their locations are as follows.

Co. "A" Laurelville.
Co. "B" Acme.
Co. "C" Byerly's School House.
Co. "D" Kecksburg.
Co. "E" Lycippus.
Co. "F" Greenlick.
Co. "G" Bear Rock.

These companies include men whose foremost thought, when they learn of a fire, is to control and extinguish it. They act accordingly. Often the fire will be under control by the time the fire warden arrives.

Here, in this community, is found that spirit which is so essential in the prevention and control of forest fires and which must be created throughout the entire State of Pennsylvania before our fire protection system can approach perfection; before we can be well protected from this most destructive enemy of the woods.

It is the spirit within the people, in general, to offer their assistance regardless of what the "rate" or "wages" may be. Compensation is a secondary, if any, consideration. The citizens realize that the fifteen cents per hour which they have been paid in the past is little or nothing in comparison with that which they preserve and protect from fire. They realize, too, that, although their efforts to preserve the forests result to some extent in benefitting the Commonwealth, they, themselves, receive the lion's share of the benefits.

Neither do they attribute the value of a forest entirely to the wood products which it yields. Its uses and value as a hunting ground and place of recreation; as a region where the fisherman may find his joy; and where the invalid may seek health and become convalescent; as a preventive of serious floods to some degree and a source of continuous water supply, as well as the labor, business, and prosperity that are assured the community through the harvesting of the timber, are understood and appreciated in this locality.

The people are always ready to volunteer with their services. They provide fire fighting tools and frequently furnish teams and automobiles to reach the fire quickly. In brief, these people are willing to help the State help them.

While the liberal services of the community are fully appreciated, special credit must be given fire warden E. C. Myers, of Mount Pleasant and his assistants for their efforts in organizing the fire companies and for securing the co-operation of the citizens."

EDUCATIONAL ACTIVITIES.

There is still a woeful ignorance abroad in the State both as to the loss occasioned by forest fires and as to the means the State is taking to suppress them. Many people still find fault with the State Fire Marshal and his deputies for not paying attention to forest fires. Others who should know better, apparently have never heard of the Department of Forestry. At a recent meeting of the State Firemen's Association in Philadelphia, newspapers reported that, as there was no organization to look after forest fires, it was proposed to ask the legislature for $500,000 a year for the organization of a force under the State Fire Marshal. This was either inexcusable ignorance or a play to the gallery. To the public, it was exceedingly misleading. One of our efforts during the coming year must be toward letting the people of the State know that a forest fire protective organization does exist and that with even less than one-tenth the amount proposed by the firemen, it is doing its very best to protect the interests of the Commonwealth.

Since September 1st, the publicity matter put out includes a revision of Circular 12 of the Department, a 7 x 9 inch sheet printed on two sides.

Circular 12 (Revised).

PENNSYLVANIA FOREST FIRE FACTS.

Five hundred thousand dollars is the average annual direct loss from forest fire within Pennsylvania. Sometimes it amounts to over $1,000,000.

Five million acres of land are being kept non-productive by forest fire. Such an area is capable of producing from 200 to 500 board feet per acre each year, or a total of at least 1,000,000 thousand feet board measure.

Twenty dollars is paid as wages for the harvesting and manufacture of each thousand feet of lumber, consequently the loss to labor each year is at least $20,000,000.

The Commonwealth loses in taxes because of this non-productive area assessed at an average of $3.00 at 20 mills, but capable of yielding twice the amount upon a fair taxation of one-tenth the value of the annual production, a total of at least $300,000. The owner is more satisfied if he can pay taxes from his yield rather than from his capital stock.

The increase in amount of wages paid would mean increased prosperity to many people.

Forest fire destroys the humus of the forest floor, which is the natural reservoir and filter of our water supply. When this reservoir is destroyed, the water supply becomes irregular and uncertain. When the filter is removed the water becomes impure and unsafe.

A people's health is directly dependent upon its water supply, and the water supply upon the forest humus. Forest fire, by destroying forest humus, seriously affects the health of our people.

The cost of disease and death from impure water is enormous and cannot be calculated in dollars and cents.

Loss of life occasionally results from forest fires.

Green trees are a promise of future prosperity, health, and happiness. A forest fire may destroy in an hour what has taken years to develop.

In order to lessen this loss to labor of from $20,000,000 to $25,000,000 and to insure a present forest value of at least $140,000,000, the Legislature appropriated $45,000 for two years' work of prevention and extinction of forest fires, an amount by no means sufficient. $100,000 per year is nearer what is needed, and more in accordance with what other States are giving. However, a reorganization of the forest fire prevention system has been authorized and is now being accomplished. Prevention and co-operation are strongly urged upon every citizen. Let us have your help.

October 15, 1915.

On the back of the circular is printed the same material as was on our 14 x 22 inch poster, first put out in September, 1913. The poster was widely distributed and since its issuance, several editions of this circular have been used to good advantage.

STOP
Forest Fires

They are a Curse to the People of Pennsylvania

FOREST FIRES DESTROY

Existing Forests
Possibility of Future Forests
Possibility of Labor
Game Animals and Game Birds
Beauty of a Region
Comfort
Homes
Lives
Prosperity

Protected Forests Increase in Value

They Furnish Labor, Promote Industry, Afford Recreation and Sport, Make a Region Beautiful, Make Homes Safe and Comfortable, Make Life Worth Living, and a Prosperous State Inhabited by a Contented and Industrious People.

Which Would You Rather Have

FOREST FIRES		GREEN FORESTS
FLOODS		PURE WATER
DISEASE	OR	HEALTH
DESTRUCTION		THRIVING INDUSTRIES
DEVASTATION		PROSPERITY

In case of fire, put it out if you can. Send for help if needed, Notify the nearest forest fire warden.

For Information Respecting Pennsylvania Forests and Forestry, Write to

COMMISSIONER OF FORESTRY,
Harrisburg, Pennsylvania.

On the back of Department form 13, which is sent to all timber cutters for the 1915 timber cut statistics, the following information was printed:

PROTECT FORESTS FROM FIRE.

When individuals cannot do what is necessary for society, the State steps in. With its own land the State recognizes that protection, largely from fire, is the first principle of sound forestry practice. But the State owns only about 1,000,000 acres of land. Conditions in Pennsylvania are such to-day that this small proportion of its total area could not possibly bring about the satisfactory conditions which can come and be maintained only by a proper forest area. Neither is it probable that the State will or ever can own enough forest land to bring about a proper equilibrium. Therefore, it recognizes its duty in the matter of protecting the general forest area within its boundaries from its worst internal enemy, forest fires. But this recognition is only in law, not in fact, for at no time in the past has there been appropriated by the Legislature an amount of money sufficient to make a reasonable insurance on the property represented.

What Forest Fires do in Pennsylvania.

1. *Fires cause the loss of human lives.* While the number of lives lost directly from this cause in Pennsylvania is small, yet some people have been burned to death and no one knows how soon others may be.
2. *Fires cause the loss of homes.* Not infrequently have forest fires furnished the spark that burned the house and possessions of families living within or near a forest.
3. *Fires cause the loss of fences, sheds, crops, stock, etc.*
4. *Fires cause the loss of felled timber.* Felled trees represent time and money. The further the process of manufacture is carried the more valuable the product. Every year thousands of dollars worth of logs, bark, cord wood for various purposes, ties, poles, posts, and sawed lumber is destroyed The workman may be out his time or wages; the owner may be out the wages paid and the profits; the user must so much the sooner pay a higher price for his wood because the supply is decreased by just so much; the Commonwealth at large suffers because property is destroyed, everybody concerned is made poorer, and no further wages, taxes, or use are possible.
5. *Fires kill much growing timber.* Fire burns the bark of trees and heats the wood immediately below the bark. The living layer of wood is just beneath the bark. If the cells of this wood are heated to a sufficient degree they cease to do their work. If the tree is small, the fire hot, or the species a sensitive one, the tree is practically girdled and dies. Where leaves and brush are piled around trees, the fire may be sufficient to burn through or to make such a scar that the first strong wind will blow the tree down. Some trees are more sensitive than others. White pine, especially young trees, and beech are very sensitive. Pitch pine is very resistant. When the pines are killed by fire, roots as well as stem are dead, whereas most hardwoods may be killed above ground but remain alive below and send up sprouts again. Spring fires are more disastrous than fall fires.

6. *Fires injure much growing timber.* When the trees are large or the bark heavy and the fire light, not many trees are killed, but the majority are injured. The trees are only partly girdled, bark drops off on one side of the base, insects and fungi begin work, and succeeding fires continue to eat into the tree and finally destroy a good part of it or kill it.
7. *Fires destroy seeds, small seedlings, and sprouts.* Upon the forest floor, mixed with leaves and humus are many tree seeds of various kinds waiting for favorable conditions to germinate and grow into trees. In most cases where stock and fire have been kept out of woodland for several years, there are thousands of young trees started, but are hardly noticeable. Fire destroys all of these, as a very small amount of heat will destroy the germ within a seed, and cook the life out of the tender plants. Even the lightest fires do considerable damage in this way, destroying the germs of prospective forests.

   By reason of the last three effects of forest fires, repeated burnings may change entirely the character of a forest in almost all of its phases, or forest conditions may be destroyed totally. The better species of trees may give place to fire cherry, quaking aspen, birch, or other light winged species. All tree growth may give place to scrub oak, sweet fern, huckleberry, bracken, or common annual herbaceous weeds. So it is reasonable to say that forest fires destroy forests and the possibilities of future forests.
8. *Fires destroy, wholly or in part, the litter and humus* on the ground within the forest. Light fires burn some leaves and small branches. Heavier fires burn everything down to mineral soil, some even following roots and other vegetable matter into the soil.
   (a) Forest litter and humus are a mechanical hindrance to the run-off of precipitation, allowing it to reach the stream slowly.
   (b) Humus absorbs and holds rains and melted snows, giving it to the soil for the underground supply which feeds springs.
   (c) Humus keeps the soil open, summer and winter, permitting it to take moisture rapidly.
   (d) Litter and humus act as a mulch preventing rapid evaporation of soil moisture.
   (e) Humus keeps the surface soil fertile, which helps to make good tree growth.
   (f) Humus protects the soil from erosion.
   (g) Humus is said to prevent the complete development of many injurious insects.

   Changing humus to ashes eliminates all of the above benefits. Floods, erosion, irregularity and impurity of water supply both for home supply and for power, and all the calamities attendant upon these conditions are the results. The loss cannot be estimated in dollars.

   The opening of the forests and the removal of humus by fire bring about conditions which make it easier for fires to rage. Each successive fire makes conditions more favorable for the next, until in time everything of value is destroyed and desolation results.
9. *Fires destroy game and fish.* Spring fires, especially, are fatal to young animals of all kinds, and many bird eggs are destroyed. Not infrequently both in spring and fall the water of some of the small streams has been heated sufficiently to kill fish. By destroying the factor which largely regulates the steady flow of streams and by making the banks of the streams bare of their natural protection, fish life is seriously affected.

10. *Fires cause a decrease of bird life.* Bird eggs and young birds are destroyed directly. By reason of frequent disturbance, birds are driven away from a region of forest fires. By the destruction of the forest and the making of desolate hills, conditions favorable to bird life are destroyed and birds become scarce.

    Scarcity of birds adversely influences agriculture.

11. *Fires destroy the beauty of a region.* The beauty of certain regions is responsible for bringing to them millions of dollars each year. Green forests covering the mountains and keeping the streams steady and clear are the most important factors in the maintenance of this asset. Fires promote desolation rather than life and beauty. A fire swept region is anything but beautiful.

12. *Forest fires are calamities.* They destroy great values without the least compensating benefit, and the trail of loss in wages, industry, taxes, revenue, prosperity, sport, health, comfort, and even life, leads to every home in the land.

A PATRIOTIC SERVICE.

Such a condition of affairs calls for each individual to do his full duty whether as a private citizen or as an official, in helping to rid the Commonwealth of forest fires, and to prevent as far as he can the calamity which the fire fiend inevitably brings. Any one connected with this work who does his full duty as best he can, must necessarily feel that he is doing patriotic service and an altruistic work. The position of an officer intrusted with the duty of prevention and extinction of forest fires, should be considered as a mark of honor, trust, and faithfulness, but must be made so largely by reason of the efficiency of the men holding the position.

This statement previously had been printed upon the back of the forest fire reports (Form 15), and upon the back of forest fire loss reports (Form 17), the latter being the form heretofore sent to individuals who were reported as having suffered from forest fires.

Under the reorganization, our fire wardens are aiding in the placing of posters and in the distribution of circulars and stickers. In one instance in Bedford county, our warden was a tax collector, and in driving over his township, he used the opportunity to spread information about forest fires.

One of our wardens in a fire infested district in Fulton county reports as follows: "After receiving those posters and small circulars, I made a special trip over my township and posted those large cards in all stores and post offices and in several other public places. Just last week I took another day and visited all our public schools. I left with each teacher a large poster and instructed them to post it conspicuously on the inside of the school room where it would not get destroyed, and I left with each teacher sufficient of the small circulars to give a copy to each pupil of the school. I gave a little talk in each school such as I thought suitable, and urged each pupil to read every word and re-read it, and if there was anything they could not understand or could not read, to have the teacher, parents, or some one else read or explain. I also asked the teachers to make themselves familiar with the contents of the circular before they handed them out and to give some explanation on them, as I thought a few words from the teacher might do more good than all a stranger might say." This warden also presented conditions to the District Attorney of his county, and spoke and wrote to others whom he thought might use their influence for good in this work.

As a result of his activities, he was hooted at, called all sorts of names, accused of wasting time and charging the State for it, and more or less annoyed in various ways. Anonymous letters about his educational activities were addressed to this office, but the gentleman is still a forest fire warden, and because of his interest and loyalty, we may expect a change of sentiment in his township before long. It is unfortunate that we do not have more wardens as energetic as he has been.

On October 22nd, I delivered an illustrated talk entitled "Burning up Millions," before the Alrich's Association in Harrisburg.

On October 27th, I attended a preliminary meeting for the organization of a Dauphin County Protective Association.

On November 5th, I spoke to the Blair County Game, Fish and Forestry Association on "The Prevention of Forest Fires."

On November 6th, I read a paper on the "Results of Forest Fires," at the annual meeting of the Berks County Conservation Association at Reading.

A paper on "The Telephone in Forest Protection" was prepared for "Telephone News," several short papers were prepared for "In the Open," and a few news items were supplied. The foresters themselves furnished material during the fall to their local papers.

Mr. Siggins delivered an illustrated talk on "Forestry" at Meadville, on December 29th, and received wide publicity in the Crawford county papers.

WORK FOR 1916.

In the coming year, there is a great amount of work that must be done in order to complete the reorganization of the forest protective system.

The force of wardens must be completed with the aid of foresters and others interested in the work.

As much as possible must be done to instruct the wardens in their duties, and to keep them interested. Where county organizations are complete, county meetings should be held so that the men may get to know each other and plan for co-operation. A forest fire warden's manual should be prepared early in the year.

Means must be found for letting the people of the State know who are fire wardens, and how the fire warden who may be needed can be reached.

Plans must be formulated for additional co-operation on the part of other branches of the State Government, timber land owners, various established organizations, and with any one who will help to prevent forest fires.

Rules and regulations must be drafted under which the railroads will do their share toward eliminating fire loss, and at the same time arrangements must be made for an extension of fire breaks along rights of way on a co-operative basis.

New protective organizations must be organized if possible.

The State must be districted according to wage scale.

The State must be districted for the future establishment of a system of outlook stations.

If possible, a start must be made upon the forest map of the State.

A general campaign of publicity must be carried on during the entire year by means of posters, circulars, news items, lectures, etc.

Needless to state, this is a large program but it is not all that ought to be done to put Pennsylvania where she should stand with respect to the protection of her forests.

FOREST FIRE DATA.

Your attention is called to the tables setting forth the information submitted to us by the forest fire wardens during 1915 and the summaries made therefrom.

Table I is a detailed statement of forest fires, showing date of fire, county and township, area, damage, cause, cost of extinction, and fire warden who submitted the report. That the data herewith submitted is incorrect goes without saying and what is presented is printed with the hope that fire wardens and others may be able to see just what information has been given to this office. It is evident that not nearly all the fires occurring in the State have been reported;

in some instances, no doubt, there are duplications, as where two fire wardens sent in separate bills for the same fire, or where the same fire was reported in different counties. It is earnestly hoped that under the new system, every fire will be reported and that there will be no duplication.

In the majority of cases our reports of area burned are mere guesses and consequently are not as definite as we would like to have them. In some cases, the estimate is too small and in others too large, but because of the number of fires which we know are not reported, it is fair to assume that the total area reported burned over is none too large. The same thing may be said of the reported damage.

It is hoped that with a better understanding of what is wanted and with some little practice, our fire wardens will come about as near to actual damage as it is possible under the circumstances. It is not infrequently found that damages are estimated with the idea of the State's reimbursing the owner for his loss, consequently the figure is high. Further, it is evident that the wardens pay too little attention to the matter and simply make a rough guess in order to answer the question.

Under the heading of causes, there are listed known and supposed causes. Many reports come in stating that the cause of a fire was "supposed to be" so and so. In other cases, a definite statement is made giving the cause. As a matter of fact, the listing of causes as we now have it is not satisfactory. Our wardens, in many cases, were not upon the ground soon enough after the fire to determine the cause with any degree of accuracy. In many cases, no particular effort was made to determine the real cause and, no doubt, in some cases, there was present in the mind of the warden the desire to shield his neighbor. At this point, there must be considerable improvement. There is no reason why the causes of at least 80% of the fires which occur should not be definitely known, nor why definite information concerning the person or persons responsible for at least 60% of the fires cannot be obtained. The enforcement of the forest fire law, to a large extent, hinges upon the faithfulness of the wardens in fearlessly reporting all facts available with respect to the causes of fires. Further, no prevention scheme can be completely organized until we know at least with some degree of accuracy the causes of fires which can reasonably be eliminated or so dealt with that the number of fires may be reduced.

The cost of extinction to individuals, as given in Table I., is only a small percentage of the actual cost. In several cases during the last several years, individual firms have spent over $2,000.00 for fire extinction. But it seems to be impossible to obtain anything like complete figures covering this expense. For the last twenty years, efforts have been made to get this information annually from the individuals suffering loss, but, on the average, not more than 60% of the forms sent out are even returned. The information obtained under such conditions is not worth the expense in getting it and I recommend that the sending of forms to individuals be discontinued.

It is believed that the publication of this table, with the name of each fire warden given in connection with fire data which he submitted will tend to put each man upon his mettle and make him doubly careful as to the facts which he submits.

In Table II., causes, area burned, damage, and cost of extinction are summarized. All causes given in Table I. are included and classified in accordance with the following standard classification suggested by the U. S. Forest Service.

LIGHTNING—Fires the origin of which is directly traceable to lightning.

RAILROADS.—Fires incidental to the construction, operation or maintenance of common carrier railroads. (This includes fires from sparks or cinders from all locomotive or construction engines, from lighted cigars, etc. thrown from car windows, from the clearing of rights of way, or from the individual carelessness of any employee or passenger.)

LUMBERING.—Fires incidental to all lumbering operations. (This includes fires caused by sawmill or dinkey engines and logging railroad locomotives, except on such logging railroads as are common carriers; and by the carelessness of all lumbering employees).

BRUSH BURNING.—Fires caused by clearing lands for any purpose (other than for rights of way for common carrier railroads, and brush burning in lumbering operations), or by rubbish, garbage, range, stubble or meadow burning, and by burning out animals, insects or reptiles.

CAMPERS.—Fires resulting in any manner from carelessness of campers, stockmen, prospectors, picnickers, surveyors, berry pickers, hunters, fishermen, automobilists, tramps, and other travelers through the forest.

INCENDIARY.—All fires maliciously set regardless of whether or not they can be classified under one of the above heads.

MISCELLANEOUS.—All fires the origin of which is known, but which can not be properly classified under any of the above heads.

UNKNOWN.—All fires the origin of which can not be determined with such degree of certainty as would justify their inclusion under any other head.

It will be observed that from eleven counties, no forest fires were reported. The total number of fires reported in 1915 is 1,101, whereas in 1913, there were reported 927, and in 1914, 1,159. The county reporting the greatest number of fires is Centre with 85. This probably covers a very high percentage of actual fires occurring, because with the whole county systematically protected, very few fires are likely to be overlooked. However, in Table III. it is seen that over half of the fires averaged less than 40 acres, about one-third of the number averaged 400 acres, and eight burned over 1,000 acres each, averaging 1,900 acres.

The next county in number of fires reported is Franklin with 65. This county is also well protected and probably few fires are unreported. There were no fires covering 1,000 acres. Thirteen fires burning more than 100 acres averaged less than 400 acres. Fourteen fires were less than one acre, and the remaining 38 averaged less than 30 acres. Observation towers, telephone lines, and organization may account for the difference. The cost of extinction in Centre county was over $1,000 more than the cost of extinction in Franklin, and $45,000 more damage was suffered in Centre. Certainly $1,000 could not be spent to better advantage than in perfecting the already organized system of protection from forest fire in Centre county. The same deductions may be obtained by comparing other counties with these.

The railroads are frequently accused of causing anywhere from 50% to 90% of the forest fires in Pennsylvania. In 1913, the fires reported by our wardens as having been caused by railroads were 217; in 1914, 222; and in 1915, 275. There can be no question that this number is entirely too high, but it must be remembered that the larger railroads are endeavoring to reduce this number under adverse conditions in many cases. On the other hand, if we add the number of fires caused by brush burning, camping, lumbering, and miscellaneous, we have 305, practically all of which are absolutely the result of carelessness or indifference. Add to this most of the fires reported as of unknown origin and we obtain a much larger percentage of fires due to causes which can be so nearly eliminated that those which could not be avoided would be very few and very small in extent. Ignorance, carelessness, and indifference of our people are the important causes of forest fires which must be attacked first and which will be the most difficult to overcome.

Damages which may be charged against various causes are as follows:

Railroads,	$185,588
Brush burning,	35,664
Incendiary,	98,419
Campers,	107,856
Lumbering,	8,100
Lightning,	2,230
Miscellaneous,	53,133
Unknown,	667,454

The total acreage reported as burned over is less than that reported in either 1913 or 1914, although the damage is higher than that of the other two years.

In 1913, $27,945.18 was paid out by the State for extinction and a very small amount of patrol service; in 1914, $32,523.19 was paid, and in 1915, $28,444 was spent. From these figures it is not difficult to forecast how far an appropriation of $45,000 for two years will go. Again, with these expenditures by the State and probably an equal expenditure by private owners, the annual direct loss has been close to, if not over, $1,000,000. With an expenditure of several times the amount of our appropriation for the perfecting of a protective system and the development of systematic co-operation among those interested, this tremendous loss could be reduced to a few thousand dollars and the forests of Pennsylvania would be redeemed.

Table III. shows that we had forest fires every month of the year except in January, August, and September. March, April, and May, October and November still remain the months in which we may expect the most fires. The first half of the year was very favorable for fires, while the second half seemed to be so well interspersed with rain that few fires were expected. Nevertheless, 162 were reported. The two months which always show up highest are April and November. In April many fishermen are along the streams and in November many hunters are in the woods. There does seem to be some relation between these facts and the number of fires reported for those months. At the same time, these two months present the best natural conditions for fires to start, namely, a dry forest floor and high winds. Any protection scheme must reach its highest effectiveness during these two months.

Table IV. classifies the fires according to area burned over. It will be noted that over half the fires were less than 100 acres in extent. About one-third burned between 100 and 1,000 acres with an average of about 350 acres; 78 were reported as having burned over 1,000 acres with a total acreage of almost 60% of the total acreage burned over by all the fires. Surely we want no more fires of this extent and it must be our aim to prevent fires reaching such a size.

Many other interesting deductions could be made from these tables but enough has been set forth to show the possibilities.

Most fires are preventable.

All must be detected quickly.

Notice of fire must be communicated quickly to some one whose business it is to extinguish it.

Men and necessary equipment must be available and preliminary organization for fire fighting must be made.

This force and equipment must begin action quickly after a fire starts.

The fire must be stopped first where it is burning hardest.

Valuable timber or other property must be saved before that of little value is looked after.

Respectfully submitted,

GEORGE H. WIRT,
Chief Forest Fire Warden.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915.

ADAMS COUNTY.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
April 10	Menallen,	500	....	?	$800	....	Incendiary,	$49 82	$30 96	R. G. Conklin.
10	Menallen,	1,000	....	....	5,000	Incendiary,	....	11 55	6 50	J. R. Williams.
17	Menallen,	.5	....	....	25	....	....	1 75	....	J. R. Williams.
23	Hamiltonban,	40	....	....	160	Incendiary,	....	13 10	13 55	L. E. Staley.
		1,540.5	....	....	$5,985			$76 22	$51 01	

ARMSTRONG COUNTY.

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
Mar. 3	Madison,	....	12	....	$50	Tramps,	....	$4 30	$1 35	W. E. Paine.
18	Madison,	....	45	....	800	....	....	5 35	....	W. E. Paine.
April 10	Madison,	....	30	....	120	....	Tramps,	7 70	....	W. E. Paine.
16	Mahoning,	....	10	....	....	....	....	3 60	....	S. A. Kunselman.
18-19	Mahoning,	....	70	....	10	....	....	12 85	....	S. A. Kunselman.
19	Madison,	....	90	....	1,800	P. R. R.,	....	17 40	6 15	W. E. Paine.
26	Mahoning,	....	20	....	10	....	....	9 85	....	S. A. Kunselman.
30	Mahoning,	....	80	$40	40	....	....	15 10	....	S. A. Kunselman.
May 11	Mahoning,	....	20	....	20	....	....	6 35	....	S. A. Kunselman.
		....	377	$40	$2,850			$82 50	$7 50	

BEDFORD COUNTY.

April	4-7	Broad Top, ...	....	100	....	$100	Incendiary, ...	....	$48 00	....	J. L. Tenley.
	6	West Providence, ...	....	75	....	200	Clearing, ...	....	14 60	....	R. W. Weicht.
	6	Broad Top, ...	....	10	....	75	H. & B. T. R. R., ..	....	23 48	....	J. L. Tenley.
	6-7	Londonderry, ...	....	120	$35	100	Camp fire, ...	....	29 85	....	H. H. Carpenter.
	7	Monroe, ...	....	20	....	100	Clearing, ...	....	4 95	....	E. Kiehl.
	7-10	Broad Top, ...	....	1,096	677	1,077	H. & B. T. R. R., ..	....	105 40	....	J. L. Tenley.
	8	Bloomfield, ...	....	50	25	225	Clearing, ...	....	9 25	....	C. Snyder.
	8-12	West Providence, ...	....	100	....	150	....	....	15 32	....	R. W. Weicht.
	15	Londonderry, ...	....	75	....	15	B. & O. R. R., ...	....	5 55	....	H. H. Carpenter.
	15-21	Broad Top, ...	....	180	....	50	....	Incendiary, ...	38 35	....	J. L. Tenley.
	16-18	Broad Top, ...	....	200	12	112	Incendiary, ...	....	29 20	....	J. L. Tenley.
	19	Monroe, ...	....	120	50	1,000	Clearing, ...	....	41 80	....	J. Barkman.
	19	West Providence, ...	....	25	85	85	Boys, ...	....	6 85	....	R. W. Weicht.
	19-20	Londonderry, ...	....	200	....	200	P. R. R., ...	....	35 06	....	H. H. Carpenter.
	19-20	Londonderry, ...	....	100	....	50	Clearing, ...	....	14 65	....	H. H. Carpenter.
	19-20	Liberty, ...	....	1,000	....	1,500	....	Fishermen, ...	57 00	....	E. R. Smith.
	20	Bedford, ...	....	800	....	800	....	Sawmill, ...	16 26	....	Wm. L. Byers.
	20	East St. Clair, ...	....	15	2	100	Sawmill, ...	....	4 45	....	D. W. Stambaugh.
	20-22	Woodbury, ...	....	100	?	200	....	Fishermen, ...	55 82	....	B. R. Brumbaugh.
	15	....	....	....	....	....	Smokers, ...				
	19	Hopewell, ...	....	395	1,797	2,797	Burning brush, ...	....	150 83	....	J. L. Tenley.
	21	....	....	....	....	....	Burning brush, ...				
	21	East Providence, ...	....	65	....	130	Burning brush, ...	....	12 65	....	S. Ritchey.
	22	Liberty, ...	....	700	....	800	Incendiary, ...	....	92 15	....	E. R. Smith.
	22	Broad Top, ...	....	10	....	10	H. & B. T. R. R., ..	....	14 85	....	J. L. Tenley.
	25	Monroe, ...	....	225	....	112	....	Incendiary, ...	17 90	....	J. Barkman.
	26	Londonderry and Cumberland Valley.	....	200	....	400	P. R. R., ...	....	32 45	....	H. H. Carpenter.
	28	Woodbury, ...	....	3	....	10	Lightning, ...	....	5 80	....	B. R. Brumbaugh.
	29	Bedford, ...	....	20	....	200	....	....	7 05	....	F. M. Agnew.
Oct.	30	Broad Top, ...	....	18	....	25	....	Hunters, ...	10 40	....	J. L. Tenley.
Nov.	2	Colerain, ...	125	50	40	215	....	Incendiary, ...	15 25	....	Wm. L. Byers.
	2	Liberty, ...	....	3	....	....	Sawmill, ...	....	1 62	....	D. F. Workman.
	2	Monroe, ...	....	.1	....	1	Smoker, ...	....	6 90	....	J. Barkman.
	3	Snake Spring, ...	....	.5	....	....	....	....	4 30	....	D. M. Miller.
	2-3	Liberty, ...	....	25	....	....	....	Hunter, ...	3 88	....	D. F. Workman.
	2-3	Londonderry, ...	....	150	....	150	P. R. R., ...	....	20 65	....	H. H. Carpenter.
	6-7	Southampton and Monroe, ..	....	50	....	25	....	Hunters, ...	6 85	....	Wm. L. Byers.
	7-8	Broad Top, ...	....	10	....	15	Incendiary, ...	....	7 02	....	J. L. Tenley.
	11	Bedford, ...	....	10	10	20	Burning brush, ...	....	5 05	....	J. A. Horning.
			125	6,324.6	$2,383	$11,049			$969 49	....	

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

BERKS COUNTY.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
Mar. 3	Robeson,		30	$40	$110	P. & R. R. R.,		$5 28		L. D. Evans.
3	Robeson,		50			P. & R. R. R.,		9 85		S. L. Parkes.
3	Richmond,		12	5	41	P. & R. R. R.,		3 60		S. L. Parkes.
4	Richmond and Ruscombmanor.		4		20	P. & R. R. R.,		2 01		S. L. Parkes.
4	Union,		100		100			4 45		S. L. Parkes.
29	Muhlenberg,		100		300			8 58		N. H. Fisher.
29	Earl,		75		375			5 80		S. L. Parkes.
30	Robeson,		8				P. & R. R. R.,	87		L. D. Evans.
April 1	Robeson,		6		25		P. & R. R. R.,	1 43		L. D. Evans.
18	Maxatawney,		15			Railroad,		5 14		S. L. Parkes.
19	Ruscombmanor,		40	140	360	Burning brush,		17 85		S. L. Parkes.
20	Bethel,		2,280	200	23,000		Incendiary,	285 68		J. R. Meck.
22	Lower Alsace,		15		45	Railroad,		5 80		S. L. Parkes.
29	Cumru,		10		200	Railroad,		2 69		F. Yoder.
May 1	Upper Tulpehocken,		10	49	124	Clearing,		6 73		L. N. Christman.
1	Upper Tulpehocken and Bethel.		500		100			9 00		L. N. Christman.
Oct. 30	Greenwich,		4		50			2 80		M. W. Snyder.
Dec. 10	Reading City,		1						?	J. E. McNeal.
			3,255	$434	$24,850			$497 81		

BLAIR COUNTY.

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
April 6	Huston,		88	$30	$400	Clearing,		$6 80		D. M. Fouse.
14	Frankstown,		20	66	236	Carelessness,			$126 25	Dr. J. A. Gold.
14-15	Antis,		105	2	72	Sawmill,		8 40		J. A. Irvin.
14-16	Woodbury,		150		450		Campers,	19 70		Wm. Hyle.

14-18 16 18	Logan, Logan, Logan,	....	200	....	500	....	Railroad,	29 90	....	G. W. Grove.
17-18	Catharine,	....	200	300	600	....	....	16 05	....	G. W. Grove.
18	Logan,	....	125	80	680	....	....	21 90	....	Wm. Hyle.
19	North Woodbury,	....	100	100	600	....	....	26 25	....	G. W. Grove.
19-20	Antis,	....	150	....	600	Sawmill,	....	15 30	....	M. H. Kensinger.
May 6	Blair,	....	600	....	900	Burning brush,	....	42 35	....	J. A. Irvin.
15	Huston,	....	30	....	150	Lightning,	....	13 50	....	Dr. J. A. Gold.
21	Catharine,	....	150	....	....	....	....	10 50	....	D. M. Fouse.
Oc. 31-No. 1	Tyrone,	....	50	....	500	Burning brush,	....	....	....	Wm. Hyle.
Nov. 2-4	Antis and Logan,	....	?	....	500	....	....	41 50	....	A. L. Fleck.
3	Frankstown,	....	1,350	....	300	....	A. N. R. R.,	60 64	....	J. A. Irvin.
5	Logan,	....	35	....	200	Logging R. R.,	....	5 03	....	Dr. J. A. Gold.
		....	....	....	....		....	....	32 00	G. W. Grove.
		....	3,353	$578	$6,688			$317 82	$158 25	

BRADFORD COUNTY.

April 9-10	Monroe,	....	185	....	$450	Railroad,	....	$3 85	....	L. T. Smith.
9-10-13	Monroe,	....	450	....	800	Incendiary,	....	24 60	....	L. T. Smith.
22	Monroe,	....	275	....	500	Clearing,	....	11 90	....	L. T. Smith.
22	Franklin,	....	15	....	300	....	....	6 55	....	C. R. Montgomery.
25	Albany,	....	8	....	25	Incendiary,	....	5 80	....	L. T. Smith.
26-27	Monroe,	....	....	....	150	Lightning,	....	9 20	....	L. T. Smith.
June 1	Franklin,	....	25	....	2	Burning brush,	....	2 20	....	C. R. Montgomery.
		....	958	....	$2,227			$64 10	....	

BUCKS COUNTY.

Mar. 3	Buckingham,	....	30	$300	$300	Railroad,	....	$2 70	....	J. Ewers.
29	Buckingham,	....	35	....	350	Children,	....	3 05	....	J. Ewers.
		....	65	$300	$650			$5 75	....	

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

CAMBRIA COUNTY.

Date.		Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
			State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
April	8	Chest,		2				Railroad,	$2 95		C. F. Gill.
	9	Chest,		200		$500		Railroad,	22 40		C. F. Gill.
	9	Reade,		150				Incendiary,	8 75		S. D. McCartney.
	15	Cresson,		80					21 55		M. Cassidy.
	15	Chest,		3		30			4 60		C. F. Gill.
	18-19	West Taylor,		200	$50				21 00		Edw. Clark.
	26	Gallitzin,		500		700		Incendiary,	26 40		H. J. Conway.
	26-27	Adams,		400	250	600			34 55		S. E. Jamison.
	26-27	Cresson,		68		25			25 10		M. Cassidy.
	26-27	Adams,		100		75	P. R. R.,		14 85		S. E. Jamison.
	28	West Taylor,		50	75				9 00		Edw. Clark.
	28-29	Chest,		300	55	355		Railroad,	68 07		C. F. Gill.
May	7	East Taylor,		150					37 05		G. C. Varner.
	10-11	Washington,		23		20			30 65		M. Cassidy.
	11	Jackson,		20	40				13 25		Edw. Clark.
June	6-7	Reade,						Incendiary,	2 40	$1 80	S. D. McCartney.
Nov.	1-2	Washington,		7	8	8			9 25		M. Cassidy.
				2,253	$478	$2,313			$351 82	$1 80	

CAMERON COUNTY.

Mar.	21	Lumber,		20		$25			$1 15		C. A. Swartz.
April	13-15	Shippen,		10		15	Burning brush,		5 20		W. B. Evans.
	14	Gibson,		229		100	B. & S. R. R.,		1 90		H. E. Elliott.
	14-15	Lumber,	40	25		200		Incendiary,	6 10		C. A. Swartz.
	16	Shippen,		100		200		Incendiary,	10 45		C. A. Swartz.
	17-21	Portage and Shippen,		40		40			17 65		W. B. Evans.

	18-19	Lumber,	80	70	......	600	......	Incendiary,	35 65	......	C. A. Swartz.
	19-20	Shippen,	......	900	......	400	......	Incendiary,	41 20	......	C. A. Swartz.
	20	Lumber,	100	......	......	100	......	Incendiary,	33 15	......	W. H. Horning.
	20-21	Lumber,	50	......	......	200	......	Incendiary,	23 65	......	C. A. Swartz.
	21-23	Shippen,	......	800	......	1,000	......	Incendiary,	43 84	......	C. A. Swartz.
	22	Lumber,	30	......	......	400	......	Incendiary,	3 85	......	C. A. Swartz.
	25-26	Lumber,	15	......	......	100	......	Incendiary,	4 45	......	C. A. Swartz.
	26	Lumber,	200	......	......	200	......	Incendiary,	24 10	......	W. H. Horning.
	26-27	Shippen,	......	500	......	1,000	......	Incendiary,	23 93	......	C. A. Swartz.
	27	Grove,	15	......	......	15	......	Incendiary,	2 50	......	W. H. Horning.
	28	Grove,	30	......	......	30	......	......	14 45	......	W. H. Horning.
	30	Grove,	500	......	......	250	......	Incendiary,	3 35	......	W. H. Horning.
	30	Grove,	300	......	......	300	......	......	28 50	......	W. H. Horning.
May	10	Grove,	......	40	......	40	Burning brush,	......	2 05	......	W. H. Horning.
Oct.	13	Lumber,	......	25	......	50	......	S. R. Coal Co.,	1 75	......	W. H. Horning.
			1,410	2,759	......	$6,265			$327 37	......	

CARBON COUNTY.

Feb.	21	Franklin,	......	12	......	$20	......	Smokers,	$4 95	......	E. D. Boyer.
Mar.	26	East Penn,	......	2	......	20	......	Railroad,	7 25	......	J. A. Kemmerer.
	27	Mauch Chunk,	......	2	......	......	Children,	......	2 35	......	J. K. Esser.
	29	Mauch Chunk,	......	500	......	......	Clearing,	......	26 65	......	J. K. Esser.
	29	East Penn,	......	10	......	80	......	L. V. R. R.,	17 65	$7 50	J. A. Kemmerer.
	29	Lower Towamensing,	......	3	......	175	......	......	8 25	......	D. Mehrkam.
	30	East Penn,	......	8.5	......	200	......	Railroad,	4 30	......	J. A. Kemmerer.
	31	East Penn,	......	6.7	......	80	......	L. V. R. R.,	4 66	......	J. A. Kemmerer.
April	1	East Penn,	......	9	......	90	......	L. V. R. R.,	12 15	......	J. A. Kemmerer.
	8	East Penn,	......	2	......	16	......	......	4 90	.90	J. A. Kemmerer.
	9	Mauch Chunk,	......	.5	......	......	L. V. R. R.,	......	.60	.30	J. K. Esser.
	9-10	Mauch Chunk,	......	500	......	......	......	......	4 39	18 75	J. K. Esser.
	9	Lehigh,	......	150	......	......	......	......	26 40	......	C. Schuchholz.
	10	East Penn,	......	20	......	160	......	......	7 00	......	J. A. Kemmerer.
	11	Packer,	......	1,000	......	......	......	......	4 00	......	R. J. Strunk.
	14	East Penn,	......	28	$110	1,104	L. V. R. R.,	......	28 65	.70	J. A. Kemmerer.
	14	Towamensing,	......	30	......	300	......	......	14 05	......	J. Neeb.
	16-17	East Penn,	......	90	......	540	L. V. R. R.,	......	11 61	......	J. A. Kemmerer.
	17	Franklin,	......	7	......	100	......	......	6 83	......	E. D. Boyer.
	18	Lower Towamensing,	......	15	......	8	C. R. R.,	......	14 35	......	D. Mehrkam.
	18	East Penn,	......	23	......	276	......	L. V. R. R.,	10 54	......	J. A. Kemmerer.
	18	Packer,	......	20	......	40	Children,	......	7 00	......	J. K. Esser.
	18	Mauch Chunk,	......	50	......	......	......	......	3 45	......	J. K. Esser.
	18	East Penn,	......	49	144	1,158	Railroad,	......	41 10	......	J. A. Kemmerer.
	19	East Penn, }	......	500	......	15,000	{ L. N. E. R. R., }	}	52 50	......	J. A. Kemmerer.
	21	East Penn, }					{ L. V. R. R., }	}			
	20	Towamensing,	......	30	......	450	......	......	16 89	......	John Neeb.
	21	Lower Towamensing,	......	3	......	300	......	......	15 50	......	D. Mehrkam.
	22	Mauch Chunk,	......	5	......	......	......	......	1 42	3 00	J. K. Esser.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

CARBON COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
25	Lehigh,		10			L. V. R. R.,		5 50		C. Schuchholz.
25	Lausanne,		1,000			L. V. R. R.,		20 00		C. Schuchholz.
26	East Penn,		1,025		20,300	L. V. R. R.,		134 99	6 00	J. A. Kemmerer.
27	Lower Towamensing,		5		300			27 05		D. Mehrkam.
May 8	Mauch Chunk,		40		90			4 75		J. K. Esser.
10	Kidder,		1,200		1,000			46 70		F. Wieder.
15	Packer,		200			Railroad,		4 50	3 75	R. J. Strunk.
June 1	Upper Towamensing,		60		250			16 15	1 05	E. D. Boyer.
Oct. 28-29	Mauch Chunk,		80				Hunters,	9 40		J. K. Esser.
			6,696	$254	$42,007			$628 02	$41 95	

CENTRE COUNTY.

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
Mar. 2	Haines,		1		$4	Sawmill,				W. J. Bartschat.
17	Haines,	5			5	P. R. R.,		$2 05		C. R. Meek.
April 4	Worth,		8		8	P. R. R.		2 55	$6 00	H. C. Woodring.
5	Taylor,		50		12	P. R. R.		2 18	13 20	G. M. Walk.
5	Snow Shoe,		80		40	N. Y. C. R. R.,		2 55		G. McCartney.
6	Haines,	1			2	L. & T. R. R.,				C. R. Meek.
8	Harris,		15		37		Smoker,	12 15		W. D. Ludwig.
8	Potter,		150		150	Burning brush,		41 10		L. G. Barnes.
8	Liberty,		50		50	B. E. V. R. R.,		6 55		Wm. Coder.
8	Snow Shoe,		15			Coal mine fire,		2 53		G. McCartney.
8	Liberty,		100		50	P. R. R.,		14 15		S. Shay.
9	Ferguson,		5		10		Railroad,	2 45		W. D. Ludwig.
9	Snow Shoe,		25		25	Clearing,		4 45		G. McCartney.
9-10	Rush,		300		150			41 55		M. Hoover.

9-10	Haines,	20	.....	.....	30	P. R. R.,	.....	9 02	.....	C. R. Meek.
9-10	Snow Shoe,	.....	2,800	382	3,022	.....	Incendiary,	40 40	20 60	G. W. Sheeler.
10	Snow Shoe,	.....	700	.....	350	N. Y. C. R. R.,	.....	16 45	7 50	G. W. Sheeler.
10	Potter and Spring,	.....	150	.....	500	Previous fire,	.....	49 29	.....	L. G. Barnes.
10	Snow Shoe,	.....	10	.....	5	Clearing,	.....	1 20	90	G. McCartney.
10	Howard,	.....	15	.....	75	Clearing,	.....	17 50	.....	S. Shay.
13	Boggs,	.....	200	.....	100	P. R. R.,	.....	8 20	2 40	G. Uzzell.
14	Snow Shoe,	.....	75	200	250	.....	Tramp,	7 75	9 00	G. W. Sheeler.
14	Snow Shoe,	.....	50	.....	100	Dinkey engine,	.....	6 07	2 50	G. W. Sheeler.
14	Rush,	.....	20	.....	.....	.....	.....	10 06	.....	G. Sankey.
15	Snow Shoe,	.....	80	.....	90	.....	Smoker,	7 95	.....	G. McCartney.
15	Snow Shoe,	.....	300	.....	800	.....	Carelessness,	11 95	15 00	G. W. Sheeler.
15	Miles,	.....	.....	.....	.....	.....	.....	39 22	9 00	R. B. Winter.
15	Marion,	.....	67	.....	200	Burning brush,	.....	17 55	.....	J. W. Holmes. W. E. Kessinger.
15	Harris,	3	.....	.....	25	.....	Fishermen,	.....	1 00	W. D. Ludwig.
15-16	Rush,	.....	75	.....	75	Clearing,	.....	8 75	.....	G. M. Pfoutz.
15-16	Curtin,	75	225	.....	300	.....	Fishermen,	24 00	.....	J. Winklebleck.
15-16	Snow Shoe and Boggs,	.....	1,500	.....	750	.....	Incendiary,	58 45	.....	J. Uzzell.
16	Penn,	4	.....	.....	5	.....	Incendiary,	2 75	3 25	C. R. Meek.
17	Rush,	.....	100	.....	.....	.....	Fishermen,	14 25	.....	M. Hoover. G. Pfoutz.
17	Miles,	.....	60	.....	150	Burning brush,	.....	28 79	.....	R. B. Winter.
17	Huston,	.....	60	.....	180	B. E. V. R. R.,	.....	7 21	.....	H. C. Woodring.
17	False alarm,	.....	.....	.....	.....	.....	.....	8 75	.....	G. W. Sheeler.
17-18	Snow Shoe,	.....	1,600	.....	800	.....	N. Y. C. R. R.,	37 30	3 40	J. Uzzell.
17-18	Haines,	.....	60	.....	100	L. & T. R. R.,	.....	16 45	16 50	C. R. Meek.
17-19	Rush (several small fires),	.....	.....	.....	.....	.....	.....	23 50	.....	M. Hoover. Wm. Garland.
18	Ferguson,	.....	500	.....	200	.....	.....	15 75	.....	W. D. Ludwig.
18-19	Rush,	.....	600	3,190	3,790	P. R. R.,	.....	81 40	.....	Wm. Garland. M. Hoover. G. Pfoutz.
18	Rush,	.....	50	.....	.....	Coal mine fire,	.....	21 30	.....	Wm. Garland.
18	Snow Shoe,	.....	80	30	110	.....	Smoker,	10 25	.....	G. McCartney.
18	Penn,	.....	700	.....	.....	.....	Incendiary,	58 86	.....	A. S. Stover.
18-19	Union and Rush,	.....	500	.....	1,200	.....	Incendiary,	86 90	2 55	E. F. Hall. W. C. Holt.
18-19	Miles & Penn,	.....	3,000	85	15,085	Incendiary,	.....	142 70	21 80	C. R. Meek.
18-19	Miles & Penn,	.....	600	.....	.....	.....	.....	30 55	.....	D. C. Rachau.
18-19	Taylor,	.....	250	.....	250	B. E. V. R. R.,	.....	24 80	.....	H. C. Woodring.
18-19	Snow Shoe and Rush,	.....	1,800	.....	3,600	N. Y. C. R. R.,	.....	58 94	10 00	G. W. Sheeler.
18-19	Miles and Penn,	.....	600	.....	.....	.....	.....	23 90	.....	C. H. Granly. D. C. Rachau.
19	Rush,	.....	50	.....	222	.....	.....	15 75	.....	G. Sankey.
19-22	Union and Rush,	.....	570	.....	550	N. Y. C. R. R.,	.....	68 00	2 40	E. F. Hall.
20	Penn,	.....	.5	.....	5	P. R. R.,	.....	.....	2 00	C. R. Meek.
21	Boggs,	.....	3	.....	5	Carelessness,	.....	1 95	1 80	G. W. Sheeler.
21-22	Beech Creek,	.....	200	.....	250	B. E. V. R. R.,	.....	6 55	3 00	G. W. Sheeler.
21-23	Snow Shoe and Boggs,	.....	500	.....	250	.....	Incendiary,	13 50	2 40	J. Uzzell.
22	Boggs,	.....	.....	.....	.....	Previous fire,	.....	1 50	.....	G. W. Sheeler.
23	Rush,	.....	40	15	15	.....	.....	6 70	.....	M. Hoover.
24	Rush,	.....	25	.....	.....	.....	.....	6 35	.....	M. Hoover. G. Pfoutz.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

CENTRE COUNTY—Continued.

Date.		Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
			State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
	25	Ferguson,		300		25			22 15		W. D. Ludwig.
	25-26	Half Moon and Ferguson,		400		300			32 65 6 95 6 85		J. P. Eves. H. C. Woodring. J. I. Reed.
	25-27	Harris,	300	150		450			113 94		W. D. Ludwig.
	25-28	Rush,	200	700		900			34 90		L. E. Hess.
	26	Penn,		4		25	P. R. R.,			6 00	C. R. Meek.
	26-27	Penn and Gregg,	1,800	40		7,000			290 53		W. E. Montgomery. C. R. Meek.
	26-27	Patton,		1,400	10	3,010			24 90		G. R. Clark.
	26-27	Ferguson and Patton,		1,500							
	26-27	Taylor,		35	60	70		Incendiary,	9 25	2 10	J. Kelley.
	28	Rush,		2			P. R. R.,		2 25		G. Pfoutz.
	28	Spring,		?			Lightning,		3 10	1 75	L. G. Barnes.
May	6	Gregg,		100		300	Incendiary,		70 40		C. R. Meek.
	11	Rush,		20		20			12 40		G. Pfoutz.
	11	Haines,		75	8	175		Smokers,	7 25		C. D. Motz.
	11	Beech Creek and Curtin,		150		60	Dinkey engine,			16 30	J. Winklebleck.
	15	Worth,		130		25	Burning brush,		5 88	2 10	H. C. Woodring.
	15	Half Moon,		80	25	125			16 20	3 00	J. P. Eves.
	15-16	Snow Shoe,		425		425			24 50	10 80	G. W. Sheeler.
	28	Haines,		.1		1	Incendiary,				C. D. Motz.
Oct.	22	Snow Shoe,		5			P. R. R.,				G. W. Sheeler.
	24	Curtin,		300				Hunters,	6 12		J. A. Mann.
Nov.	1	Marion,		125			Hunters,		7 45		J. W. Holmes.
	2-3	Boggs,		820	10	430		Hunters,	29 48	3 00	G. W. Sheeler.
	14	Taylor,		5				Hunters,	9 05	90	M. Hoover.
Dec.	11	Penn,		2		4			2 50	1 40	C. R. Meek.
		Patrol service during spring of 1915.							75 25		G. W. Sheeler.

	Patrol service during fall of 1915.							150 25		G. W. Sheeler.
	One-half bills of Central Penna. Protective Asso., per G. W. Sheeler, Sec.							46 85		G. W. Sheeler.
		2,408	25,712.7	$3,715	$52,527			$2,288 90	$206 55	

CHESTER COUNTY.

April 25	Highland,		5	$53	$78			$38 88		H. B. Weise.
May 1	South Coventry,		3		75			4 55		E. J. Essick.
			8	$53	$153			$43 43		

CLARION COUNTY.

April 14-15	Mill Creek,		150		$200	Burning brush,		$21 70		J. Nicholson.
17	Limestone,		10					8 65		T. D. Spence.
20	Clarion,		30				Incendiary,	13 20		J. C. Sampson.
27-28	Limestone,		12	$10	24	Lightning,		30 50		T. D. Spence.
28-May 1	Limestone,		305	500	500	N. Y. C. R. R.,		95 80		T. D. Spence.
May 7	Clarion,		60					26 80		J. C. Sampson.
13-14	Mill Creek,		60		50	Clearing,		32 60		J. Nicholson.
18	Clarion,		25					14 40		J. C. Sampson.
19	Clarion,		75					36 25		J. C. Sampson.
			727	$510	$774			$279 90		

CLEARFIELD COUNTY.

April 4-5	Karthaus,		300		$150	N. Y. C. R. R.,		$9 95		E. J. Cole.
5	Huston,	15				Children,		8 50		H. C. Scofield.
5-6	Knox,		125			Railroad,		2 90		D. C. Barnett.
8-9	Chest,		50		100			19 25		R. V. McGarvey.
9-10	Beccaria,		10		25	Clearing,		5 00		A. Straw.
10	Bigler,		2					1 60		C. G. Gill.
14-16	Huston,		1,000		500			211 45		C. L. Kirk.
15	Bloom,		15		50		Fishermen,	6 85		M. W. Lines.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

CLEARFIELD COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
15-16	Woodward,		300		450			33 20		A. Moyer.
15-20	Bell,		30		150		Fishermen,	10 25		J. W. Cross.
16	Sandy,		1,000		2,000		Fishermen,	52 55		H. C. Scofield.
17	Chester Hill Borough,		3		50		Fishermen,	1 45		B. Cowperthwaite.
17	Huston,		100		50		Children,	38 05		C. L. Kirk.
17-18	Decatur,		150		1,120			37 15		G. Sankey.
18	Brady,		50			Smokers,		23 15		W. P. Wingert.
18	Huston,		150				Railroad,	36 65		C. L. Kirk.
18-19	Chest,		100		200			37 85		R. V. McGarvey.
18-19	Lawrence and Goshen,		1,000	$100	3,100			22 75		W. E. Goss.
18-19	Knox,		2					3 10		D. C. Barnett.
18-20	Pike,		245	2,272	3,497	Fishermen,		40 15		G. O. Goss.
19	Penn,		5		25		Fishermen,	5 75		W. K. Danvir.
19	Sandy,		1,500				Lumbering,	56 70		H. C. Scofield.
19-20	Huston,		300		150		Railroad,	108 25		C. L. Kirk.
19-21	Knox,		450		900			34 45		D. C. Barnett.
20-21	Huston,		300		150		Railroad,	77 25		C. L. Kirk.
20-22	Woodward,		60	70	70		Incendiary,	20 65		A. Moyer.
21	Karthaus,		50	40	900	N. Y. C. R. R.,		9 40	3 20	N. R. McNaughton.
21-22	Knox,		175		350			6 00		D. C. Barnett.
21-22	Lawrence & Goshen,		1,000		500			16 75		W. E. Goss.
24-25	Huston,		300		150		Railroad,	76 45		C. L. Kirk.
25-27	Chest,		100		250			47 20		R. V. McGarvey.
26-27	Decatur,		40		90		P. J. & E. R. R.,	12 75		G. Sankey.
27	Karthaus,	3			10	Lightning,		2 95	4 00	N. R. McNaughton.
27-28	Karthaus,	3			10	Lightning,		3 75	40	N. R. McNaughton.
28	Knox,		12		24			8 75		D. C. Barnett.
28-29	Knox,		8		16	Clearing,		2 75		D. C. Barnett.
28-30	Lawrence,		1,000		2,000		Fishermen,	41 75		C. E. Zerby.
28-May 1	Woodward,		1,400	50	970			52 55		A. Moyer.
29	Sandy,		300		200	Railroad,		18 45		G. Beer.
29	Penn,		10		40	Clearing,		9 50		M. W. Lines.

	29–30	Chest,		30		150	P. R. R.,		13 30		R. V. McGarvey.
	29–30	Goshen,		1,500					11 10		M. Liegey.
	29–30	Huston,		200		100			67 30		C. L. Kirk.
	29–31	Brady,		150	30			Fishermen,	50 60		W. P. Wingert.
	30	Brady,		50		50			4 10		W. K. Danvir.
May	1–2	Beccaria,		25				Cattle herders,	11 00		G. A. Herdman.
	6–7	Beccaria,			10	60		Cattle herders,	16 25		G. A. Herdman.
	8	Covington,		50		25			4 00		N. R. McNaughton.
	8–9	Knox,		30		60	Clearing,		2 05	1 50	D. C. Barnett.
	10–11	Rush,		40		600			13 50		G. Sankey.
	11–12	Lawrence,		500	100	300			26 50		Wm. F. Dague.
	11–12	Lawrence,		50		75		Fishermen,	4 00		C. E. Zerby.
	14	Goshen,	4			2		Incendiary,	4 75		N. R. McNaughton.
	14–15	Penn,		100		50			7 55		W. K. Danvir.
	15	Bigler,		25					4 35		C. G. Gill.
	15	Girard,		90		15	Lumbering,		4 85		N. R. McNaughton.
	15–16	Lawrence,		200		10		Incendiary	24 45		Wm. Goss.
			25	14,682	$2,447	$19,724			$1,477 65	$9 10	

CLINTON COUNTY.

Mar.	4	Chapman,		50		$25	G. & P. R. R. R.,			$2 63	H. F. Critchley.
	16	Colebrook,		75		60	Railroad,		$2 75	22 50	J. F. Young.
	22–23	Bald Eagle,		40					7 06		J. Kirby.
	27	Chapman,		15		15	Burning brush,		3 65		H. F. Critchley.
	28	Noyes,		75		150	Boys,		11 35		F. H. Dutlinger.
April	1–2	Grugan,	8	25			Railroad,		2 50	21 60	J. B. Ryon.
	3–4	Grugan,	20	2			Railroad,		4 45	15 90	J. B. Ryon.
	4	Colebrook,		46		300	P. R. R.,		13 50		J. F. Young.
	4	Lamar,	1			10	Incendiary,		1 75	1 20	J. R. Hogentogler.
	7	Chapman,		1		5		Children,	1 95	40	H. F. Critchley.
	8	Colebrook,		185		1,350	P. R. R.,		2 75		J. F. Young.
	8	Bald Eagle,		40					3 56		J. Kirby.
	8	Colebrook,	110	50						55 85	J. B. Ryon.
	8	Grugan,	6	14			Railroad,		60	22 25	J. B. Ryon.
	8	Grugan,		35			Railroad,		2 35	11 00	J. B. Ryon.
	9–10	Grugan,	180				Railroad,		5 65	63 10	J. B. Ryon.
	9–11	Bald Eagle,		140					34 70		W. L. Schadt.
	10	Leidy,		10		500	Burning brush,		75	2 40	M. E. Muller.
	13	Chapman,		20			Railroad,		60	20 70	J. B Ryon
	13	Colebrook,		150		750	P. R. R.,		2 75	9 62	J. F. Young.
	14–15	Castanea,		55			Railroad,		34 40		W. L. Schadt.
	15	Greene,		800		1,500	Incendiary,		22 95		H. S. Metzger. C. H. Gramly.
	15–18	Castanea,		300	250	250			19 50		W. L. Schadt.
	15–21	Wayne,	100	2,000		8,000		Incendiary,	94 27	8 40	J. R. Hogentogler
	16–21	Wayne,	1,500	2,000		7,000		Fishermen,	92 45	10 20	J. R Hogentogler

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued

CLINTON COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
17-18	Greene,		200		350		Incendiary,	60 05	7 20	H. S. Metzger.
17-18	Castanea,			150	150			11 90		W. L. Schadt.
17-18	Lamar and Wayne,	500	1,500		5,000			133 25	27 00	J. R. Hogentogler
17-18	Pine Creek and Gallagher,		500		1,500	Fishermen,		182 81		W. M. McKinney.
17-21	Bald Eagle,	80						17 56		J. Kirby.
18-21	Bald Eagle, Porter and Lamar.		4,500	27		P. R. R.,		133 45		J. B. Strunk.
18-19	Castanea,		40			Burning brush,		30 70		W. L. Schadt.
19	Beech Creek,		2,500			P. R. R.,		75 46		Wm. Coder.
19-21	Bald Eagle,		200				Carelessness,	25 27		J. Kirby.
19-21	Wayne,	100	500		1,500			75 95		J. R. Hogentogler.
20	Leidy,				2	Fishermen,		60		M. E. Muller.
20	Greene,		2,500		4,000		Incendiary,	8 95	1 60	H. S. Metzger.
20-22	Leidy and Noyes,	150	2,000		5,000			3 45	3 60	M. E. Muller.
20-26	Leidy,	400	2,000		5,000	Railroad,		19 75	3 60	M. E. Muller.
21	Crawford,		2,000			Fishermen,		66 36		C. C. Fetterhoof.
21-28	Noyes, Chapman and Grugan.	4,400	30,000		35,000	Fishermen,		239 68	85 20	H. F. Critchley. F. H. Dutlinger. J. B. Ryon.
21	Colebrook,	75		1,360	1,735	Railroad,		4 00		J. F. Young
21	Crawford,		300		600			26 80		H. S. Metzger.
21-23	East Keating,	200	1,000				Incendiary,	33 80	8 50	W. H. Horning.
21-23	Leidy,	250	250		500	Fishermen,		16 65	12 90	M. E. Muller.
25	Grugan,		4			Railroad,		30	5 17	J. B. Ryon.
26-27	Grugan,	160	40			Incendiary,		51 85	9 20	J. B. Ryon.
28-30	East Keating,	200						3 00	6 00	M. E. Muller.
29-30	Beech Creek,	600			2,000	Incendiary,		90 25	27 30	F. H. Dutlinger.
May 1	Chapman,	4,000			10,000	Incendiary,		497 30	24 00	H. F. Critchley.
14	Leidy,		50		25			4 00		M. E. Muller.
19	Noyes,		25		35	Incendiary,		4 45	2 30	F. H. Dutlinger.
19	Leidy,		50		50			2 60		M. E. Muller.
Oct. 23	Chapman,		2				Children,			H. F. Critchley

Nov.	23-24	Noyes and Chapman,	15	300		160		Hunters,	10 30		L. O. Weaver.
	2	Noyes,		70				Incendiary,	26 20		H. E. Kepler.
	2-3	Chapman,		75		26		Hunters,	11 20	8 00	H. F. Critchley.
	2-3	Bald Eagle,		25					5 80	2 40	J. L. Harvey.
	4-5	Noyes,	300			500			15 70	7 80	F. H. Dutlinger.
			13,275	56,789	$1,760	$93,047			$2,247 62	$509 52	

COLUMBIA COUNTY.

Mar.	16-17	Beaver,		200				Incendiary,	$18 50		W. W. Boone.
	28	Beaver,		100			Incendiary,		12 15		W. W. Boone.
April	2	Briar Creek,		3			Burning building,		10 30		G. B. Robbins.
	8	Pine,		30			Burning brush,		7 00		W. R. Bitler.
	9-10	Roaring Creek,		500		$5,400	Burning brush,		32 97		F. H. Craig.
	18-20	Roaring Creek,		500		3,500			97 13		F. H. Craig.
	19	Mifflin,		100		85			3 25		R. M. Lutz.
	20-22	North Union and Beaver,		2,000		4,000	Steam shovel,		67 25		W. W. Boone.
				3,433		$12,885			$248 55		

CUMBERLAND COUNTY.

Mar.	20	Hampden,		20		$20			$5 90		J. W. Waggoner.
April	1-3	East Pennsboro,		65				Incendiary,	66 20		B. F. Shuman.
	4	Dickinson,		3.5		25	G. & H. R. R.,		4 48	$4 25	J. R. Williams.
	6	Frankford,		2		10	Burning brush,		3 30		A. G. Mounts.
	6	South Middleton,		4		40	Burning brush,		6 69		I. A. Coulson.
	8	East Pennsboro,		10		67		Incendiary,	3 15		B. F. Shuman.
	8	Rye,		20		133		Incendiary,	4 60		B. F. Shuman.
	10	Hampden,		67		50	Burning brush,		25 55		J. W. Waggoner.
	10	Southampton,		300							R. G. Conklin.
	18-19	Cooke and Dickinson,	500	15		1,000		Carelessness,	45 10	15 65	J. R. Williams.
	20	Penn,		2,000		10,000	Fishermen,		66 60		J. H. Myers.
	20-22	Penn, Cooke and Dickinson,	4,000	1,000	$3,375	50,000			134 16	65 18	J. R. Williams.
	20-22	Menallen,	400	160	150	4,000			96 65		J. R. Williams.
	21	Penn,		4,000		20,000	Previous fire,		96 75		J. H. Myers.
	21-22	Hopewell,	125	75		60		Incendiary,	58 32		E. P. Hassinger.
	22	Hopewell,		30		30		Incendiary,	6 57		E. P. Hassinger.
	22	Penn,		4,000		20,000	Previous fire,		84 10		J. H. Myers.
	22-26	Lower Dickinson,	25	175		1,600			25 75		J. R. Williams.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

CUMBERLAND COUNTY—Continued.

Date.		Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
			State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
	25	Dickinson,	500	500	....	4,000	....	....	13 80	10 00	J. R. Williams.
	26	Dickinson,	....	500	....	1,500	....	....	22 15	12 38	J. R. Williams.
Nov.	3	South Middleton,	....	500	....	5,000	Railroad,	....	28 60	....	J. R. Williams.
	12	Upper Mifflin,	....	80	....	....	....	....	8 69	8 69	E. P. Hassinger.
	27	Hampden,	....	30	....	40	....	Hunters,	4 35	....	J. W. Waggoner.
			5,550	13,496.5	$8,525	$117,575			$811 46	$116 05	

DAUPHIN COUNTY

Date.		Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
Mar.	2-3	Williams,	....	300	....	$300	P. & R. R. R.,	....	$29 45	....	J. Williams.
	2-3	Wiconisco,	....	15	....	....	P. & R. R. R.,	....	24 20	....	C. W. Seifert.
	3	Upper Paxton,	....	48	....	96	P. & R. R. R.,	....	3 05	$14 40	W. C. Mills.
	4 31	Washington and Elizabethville Borough.	....	5	....	10	....	P. R. R.,	5 25	....	T. G. Lentz.
	12	Upper Paxton,	....	8	....	20	P. R. R.,	....	2 27	9 90	W. C. Mills.
	17	Upper Paxton,	....	20	....	80	Camper,	....	8 70	....	W. C. Mills.
	23	West Hanover,	....	8	....	15	Children,	....	1 45	....	J. H. Mumma.
	28	Upper Paxton,	....	5	....	15	P. R. R.,	....	3 30	....	W. C. Mills.
	29	Derry,	....	50	....	75	....	....	12 15	....	C. F. Herr.
	30	Washington,	....	3.5	....	80	Railroad,	....	2 60	....	H. E. Lubold.
April	1	East Hanover,	....	300	....	....	P. & R. R. R.,	....	6 15	....	J. F. Hampton.
	2	East Hanover,	....	20	....	....	P. & R. R. R.,	....	1 00	60	J. F. Hampton.
	2	East Hanover,	....	640	....	....	....	....	26 85	24 15	J. F. Hampton.
	4	Upper Paxton,	....	2	....	4	P. R. R.,	....	2 65	....	W. C. Mills.
	5	West Hanover,	....	15	....	100	Burning brush,	....	1 76	....	J. H. Mumma.
	5	Williams,	....	80	....	80	W. V. R. R.,	....	7 00	....	M. Knorr.

	5-6	Williams,		300		1,000		W. V. R. R.,	41 25		J. Williams.
	8	Washington,		700		2,500	Railroad,		20 55		H. E. Lubold.
	8	Rush,		150		140			11 85		M. Knorr.
	8	Upper Paxton,		86		412			17 66		W. C. Mills.
	8	Washington,		10		100		P. R. R.,	14 72		T. G. Lentz.
	9	Wiconisco,							13 50		C. W. Seifert.
	9-10	East Hanover,		70	$50	650			15 90		J. F. Hampton.
	10	Washington,		150		150	P. R. R.,		11 25		T. G. Lentz.
	10	Upper Paxton,		30		69	P. R. R.,		1 00	14 40	W. C. Mills.
	13	Wiconisco,		8			Railroad,		9 00		C. W. Seifert.
	14	Upper Paxton,		127	3	75	P. R. R.,		8 75	30 00	W. C. Mills.
	14	Wiconisco,		80		50	W. V. R. R.,		11 15		M. Knorr.
	15	Halifax,		33		76		Railroad,	13 72		H. B. Hoffman.
	17	Washington,		30		400	Railroad,		11 90		H. E. Lubold.
	17	West Hanover,		20		100	Burning building,		7 35		J. H. Mumma.
	17-22	Washington, Jackson and Jefferson.	2,000	2,000		6,000	S. B. R. R.,		23.18 21 35 31 90 115 10		T. G. Lentz. P. Parmer. J. H. Romberger. J. M. Rutter.
	17-18	Middle Paxton,		116		300	Logging engine,		32 80		J. M. Lebo.
	17-19	Williams,		500		1,500			59 06		J. Williams.
	18	Washington,		4		50	Railroad,		2 05		H. E. Lubold.
	18-20	Rush and Jackson,		650		700	P. R. R.,		83 50		M. Knorr.
	18-21	Rush,		400		800	W. V. R. R.,		40 10		E. S. Carl.
	20	Williams,		250		500			18 50		J. Williams.
	21	Upper Paxton,		4		8	P. R. R.,		4 00		W. C. Mills.
	23	Upper Paxton,		35		105	P. R. R.,		6 80	15 60	W. C. Mills.
	23-24	Susquehanna,		150		450		Smoker,	22 40		E. O. Hassler.
	25-26	Susquehanna,		100		300		Smoker,	11 25		E. O. Hassler.
	27	Washington,		.5		1		P. R. R.,	5 45		T. G. Lentz.
	28	Washington,		25		254	Railroad,		16 45		H. E. Lubold.
	30	Washington,		1.5		15			5 35		H. E. Lubold.
May	2	Wiconisco,		.5		5	Railroad,		2 85		H. E. Lubold.
	6	Jefferson,		6		60		Fishermen,	11 40		J. M. Rutter.
	11	Williams,		80		85	W. V. R. R.,		12 65		M. Knorr.
June	8	Jefferson,		20		40	Sawmill,		7 25		J. M. Rutter.
Oct.	24-25	Williams and Jackson,		300		1,500		Hunters,	30 95		J. Williams.
Nov.	1-2	Williams,		300		500		W. V. R. R.,	26 60		J. Williams.
	1-3	Lykens,		1,000				Hunters,	93 97		J. Schmeltz.
	2	Conewago,		5			Railroad,		5 50		J. S. Farver.
	2	Williams,		250		250	P. & R. R. R.,		17 90		M. Knorr.
	8-12	Middle Paxton,		2,000		5,000	Hunters,		66 35		J. Lebo.
	11	Upper Paxton,				75	P. R. R.,		5 75		W. C. Mills.
			2,000	11,516	$53	$25,045			$1,127 28	$109 05	

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

ELK COUNTY.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
April 15-16	Jay,	....	400	....	$200	....	....	$91 60	....	C. L. Kirk.
17-18	Jones,	....	250	....	....	Incendiary,	....	14 34	....	G. W. Bowley.
18-20	Benzinger,	....	800	....	....	....	....	54 00	....	J. Smithbauer.
19-20	Benezette,	135	250	....	988	P. R. R.,	....	....	$10 00	C. E. Zerby.
21-22	Fox,	....	75	$975	975	P. S. & N. R. R.,	....	28 60	....	J. Smithbauer.
21-30	Ridgway,	....	1,500	....	1,000	....	....	507 80	....	S. Johnson.
26-27	Jones,	....	2	....	20	....	....	3 08	....	G. W. Bowley.
27-29	Fox,	....	200	800	925	P. S. & N. R. R.,	....	49 30	....	J. Smithbauer.
29-30	Benezette,	....	200	....	600	....	Incendiary,	14 65	....	C. A. Swartz.
29-30	Benezette,	....	200	....	500	....	B. & S. R. R.,	27 63	4 00	C. E. Zerby.
29-30	Highland,	....	100	200	700	Lightning,	....	57 60	....	S. Johnson.
30	Jones,	....	1	....	10	....	....	1 88	....	G. W. Bowley.
May 14-15	Fox,	....	60	....	75	P. S. & N. R. R.,	....	14 90	....	J. Smithbauer.
June 8	Jay,	....	50	....	62	Burning brush,	....	....	....	C. E. Zerby.
	Expenses incurred in inestigating fire wardens.	....	....	....	....	....	....	7 08	....	C. E. Zerby.
		135	4,088	$1,975	$6,055			$872 46	$14 00	

FAYETTE COUNTY

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
Mar. 18	Bullskin,	....	30	....	$50	Boys,	....	$4 55	....	E. C. Myers.
April 4	North Union,	....	60	$5	....	Incendiary,	....	2 80	....	J. C. Beatty.
7	Connellsville,	....	104	....	....	....	....	9 85	....	N. Morgan.
7	North Union,	....	50	25	....	Unknown,	....	12 40	....	J. C. Beatty.
8						Boys,	....		....	J. C. Beatty.
9						Incendiary,	....	....	....	J. C. Beatty.

8	Connellsville,	....	300	....	....	....	....	13 45	....	N. Morgan.
8-9	Connellsville,	....	300	....	....	....	....	14 40	....	N. Morgan.
8-10	Georges,	....	1,000	4	2,000	Incendiary,	....	72 55	....	G. Harding.
9	Connellsville,	....	175	....	....	....	....	8 15	....	N. Morgan.
10	Connellsville,	....	70	....	....	....	....	11 15	....	N. Morgan.
21	Henry Clay,	....	100	....	1,100	Burning stumps,	....	6 65	....	J. H. Humberston.
May 11	Bullskin,	....	25	8	258	....	....	11 80	....	E. C. Myers.
Oct. 30	Wharton,	....	20	....	15	....	Hunters,	8 29	....	Wm. Chianell.
Nov. 10-11	Georges,	....	150	....	....	....	....	14 20	....	G. Harding.
10-12	Georges,	....	....	....	....	....	....	7 95	....	J. C. Beatty.
26	Stewart,	....	50	....	....	....	....	8 87	....	J. C. Beatty.
		....	2,334	$42	$3,423			$197 06	....	

FOREST COUNTY.

April 21-23	Tionesta,	....	2,266	$190	....	Burning brush,	....	$77 65	....	Asa W. Heath.

FRANKLIN COUNTY

Mar. 30	Quincy,	....	30	....	$10	Incendiary,	....	$2 07	54	L. E. Staley.
1-5	Fannett,	....	50	....	....	Incendiary,	....	13 80	....	C. H. Burk.
3	Quincy,	....	9	....	5	Incendiary,	....	90	27	L. E. Staley.
17	Quincy,	....	.5	....	4	Incendiary,	....	....	95	L. E. Staley.
21	Quincy,	....	4	....	8	Incendiary,	....	....	48	L. E. Staley.
25	Guilford,	....	2	....	8	Incendiary,	....	....	93	L. E. Staley.
26	Green,	5	6	....	....	....	....	2 95	....	R. G. Conklin.
26	Quincy,	....	1.5	....	6	Incendiary,*	....	85	1 18	L. E. Staley.
28	Green,	.1	....	....	....	Smokers,	....	71	1 29	R. G. Conklin.
30	Quincy,	....	1	....	4	Incendiary,	....	40	18	L. E. Staley.
April 1-5	Fannett,	....	100	....	30	Incendiary,	....	30 35	....	C. H. Burk.
4	Montgomery and Warren,	....	255	....	765	....	....	66 60	....	A. E. Rupp.
4	Quincy,	50	3	....	106	Incendiary,	....	5 05	4 25	L. E. Staley.
5	Quincy,	....	16.5	....	33	Incendiary,*	....	1 46	2 26	L. E. Staley.
6	Washington,	....	10	....	25	....	....	1 15	....	H. L. Thomas.
6-7	Warren,	....	600	....	....	....	....	32 64	....	L. A. Zimmerman.
7	Peters and Warren,	....	260	....	780	Incendiary,	....	15 90	....	A. E. Rupp.
7	Guilford,	8	....	....	24	....	Carelessness,	2 58	10 90	L. E. Staley.
8	Metal,	....	4	....	....	Accidental,	....	1 95	....	A. E. Rupp.
9	Quincy,	....	15	....	60	Incendiary,	....	15 08	27 56	L. E. Staley.
9	Quincy,	10	65	....	100	....	....	6 70	75	H. L. Thomas.
9	Quincy,	150	....	....	400	....	....	8 50	1 25	H. L. Thomas.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

FRANKLIN COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
10	Quincy,		1.5		6	Incendiary,		71	1 17	L. E. Staley.
15	Quincy,	1.5			5		Fishermen,		10	H. L. Thomas.
17	Letterkenny,		30		235	Burning brush,		28 80	75	A. E. Rupp.
17	Letterkenny,		25		50	Burning brush,		16 00	4 75	A. E. Rupp.
17-19	Letterkenny,	205	20		225	Incendiary,		155 98	21 90	A. E. Rupp.
18-19	Green,		250		1,250	Incendiary,		55 39	40 95	R. G. Conklin. W. L. Eckenrode. W. E. Perry.
19	Montgomery,		200		450	Burning house,		49 03	90	A. E. Rupp.
19	Quincy,		100		350			12 73	1 44	H. L. Thomas.
20	Metal and Letterkenny,		80		160	Lightning,		63 10		A. E. Rupp.
20-22	Letterkenny,		1,000	$50	1,025	Clearing,		64 20		E. S. Newton.
20-22	Letterkenny, Metal and Fannett,		800					96 59		E. S. Newton. D. L. Sentman. C. H. Burk.
22	Washington,		80		200			11 50	2 70	H. L. Thomas.
22	Washington,	75			150			10 30	1 26	H. L. Thomas.
25	Metal,		175		350			23 40		A. E. Rupp.
25	Washington,		35		50			7 16		H. L. Thomas.
30	Guilford,	1			4	Lightning,		2 51	6 93	L. E. Staley.
May 1	Montgomery,		25		50	Lightning,		6 83		A. E. Rupp.
Oct. 23	Quincy,		.5		1	Incendiary,			18	L. E. Staley.
Nov. 1	Washington,		3		5	Hunter,		42	33	H. L. Thomas.
1-3	Montgomery,		700		350			105 75		J. V. Hornbaker. Benj. Shives.
2	Peters,		45		90	Steam shovel,		9 09	28 25	A. E. Rupp.
2	Peters,		.5			Children,		61		A. E. Rupp.
2	Peters,		1			C. V. R. R.,		68	60	A. E. Rupp.
2	Quincy,		2		2	Incendiary,		96	35	L. E. Staley.
2-3	Lurgan,		240		360			50 75		D. L. Sentman.
3-4	Fannett,		300		50			11 08		C. H. Burk.
5	Quincy,		1		1	Incendiary,		36	18	L. E. Staley.
6	Quincy,		.5		1	Incendiary,		09	10	L. E. Staley.

	6	Green,		1					1 25		W. L. Eckenrode.
	7	Green,		8					4 63		W. L. Eckenrode.
	7	Washington,		8		15			1 18	25	H. L. Thomas.
	7	Washington,		3		6				35	H. L. Thomas.
	8	Quincy,		1		1	Incendiary,			15	L. E. Staley.
	8	Quincy,	2			3				15	H. L. Thomas.
	9	Quincy,		.2			Incendiary,			10	L. E. Staley.
	10	Lurgan,		10		20			7 94		D. L. Sentman.
	11	Fannett,		75		80			13 24		J. F. Lytle.
	13	Fannett,		80					10 00		J. H. Ziegler.
	27	Quincy,		11.8		11	Incendiary,		5 21	50	L. E. Staley.
	29	Metal,		2		1	Hunter,		5 91	60	A. E. Rupp.
Dec.	9	Metal,		.5				Imbecile boy,	1 11		A. E. Rupp.
	10	Metal,						Imbecile boy,	1 11	20	A. E. Rupp.
	21	Green,		2						2 10	R. G. Conklin.
			502	5,745	$50	$7,875			$1,045 13	$168 02	

*Set by a deaf mute. Arrested and tried. Acquitted by a sympathetic jury but made to pay half the costs.

FULTON COUNTY.

April	7-9	Belfast,		1,000		$300			$67 75		M. J. Hixson.
	18	Licking Creek,		20	$5	100			12 00		R. R. Hann.
	18	Wells,		1,000	1,000	2,800		Incendiary,	10 65	$23 70	J. Harnish. A. H. Stevens.
	20	Dublin,		30		200	Traction engine,		29 80		E. E. Fraker.
	20-21	Licking Creek,		600	152	2,000	Burning brush,		74 47		R. R. Hann.
	24-26	Brush Creek,		2,000		1,000	Incendiary,		94 55		M. J. Hixson.
May	4	Wells,		2		6		Fishermen,	4 10		A. H. Stevens.
Nov.	6	Dublin,		30	15	60	Hunters,		19 56		E. E. Fraker.
				4,682	$1,172	$6,466			$312 88	$23 70	

HUNTINGDON COUNTY.

Mar.	27	Lincoln,		4	$5	$15			$3 70		R. R. Maloney.
April	6-7	Todd,		60		90	J. & S. R. R.,		6 37		W. E. Houpt.
	9-10	Shirley,		81	50	404			32 25		A. R. McCarthy.
	9-10	Todd,		60		90		J. & S. R. R.,	18 30		W. E. Houpt.
	12-23	Todd,		2,000	1,050	16,050		J. & S. R. R.,	166 47		A. Saylor.
	15	Jackson,	1					Fishermen,		$1 30	W. D. Ludwig.
	15	Oneida,		10	100		Burning stumps,		4 20		T. R. Morton.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

HUNTINGDON COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
17	Lincoln,		2		5	Accidental,		4 50		R. R. Maloney.
17-19	Brady,		300		900	Tramps,		96 65		A. R. McCarthy.
17-22	Logan and Oneida,		3,000	375	3,375			92 28		T. R. Morton.
18	Oneida,		20	15	65	Sawdust pile,		10 30		G. W. Hetrick.
18	Warriors Mark,		300		1,500			47 30		E. Nearhoof.
18-19	Warriors Mark,		2,500		10,000	Incendiary,		26 75		E. Nearhoof.
19	Franklin,		1,200		2,000		Incendiary,	40 25		J. C. Miller.
19-20	Shirley,		120	8		Burning brush,		80 95		H. S. Myers.
19-20	Springfield,		85	100	200	Burning brush,		11 05		C. P. Greene.
20-21	Tell,		8			Burning brush,		8 75		H. H. Burdge.
21	Miller,		8		40	Burning brush,		5 95	6 25	T. O. Bietsch.
22	Union,		20		50	Logging engine,		2 70		J. C. Dell.
25	Dublin,		25		50			20 98		A. E. Rupp.
25	Jackson,		.1				Incendiary,	2 80	1 20	W. D. Ludwig.
25	Jackson,	2			50			5 04		T. O. Bietsch.
May 15	Jackson,	10			10		Smoker,	2 80	1 60	W. D. Ludwig.
19-20	Shirley,		1			Lightning,		85		A. W. Bodine.
Oct. 25	West,		4		10		Hunters,			T. R. Morton.
29	Henderson,		4		20	Hunters,		7 80		G. W. Hetrick.
31	West,	5	2		50		Smokers,			T. R. Morton.
Nov. 1	Brady,		300		300			24 57		W P. Metz.
1	Hopewell,		10				Hunters,	6 85		L. W. Treece.
1-3	Union,		600		600		Hunters,	64 56		W. W. Wright. Wm. Black.
2	Cass,		5		125			5 46		Wm. Black.
3	Penn,		25					4 12		R. A. Norris.
8	Union,		33		66		Hunters,	7 60		T. O. Bietsch.
23	Lincoln,		2.F		8					W. E. Houpt.
No.30-Dec.1	Todd,		10		15	J. & S. R. R.,				W. E. Houpt.
		17.1	10,749.6	$1,783	$36,068			$812 15	$10 35	

INDIANA COUNTY.

May	9-10	White,		136	$32	$304		Burning brush,	$29 95		John Nealer.

JEFFERSON COUNTY

Mar.	1	Winslow,		7		$10	P. R. R.,		$8 00		W. T. Cox.
	2	Reynoldsville Borough,		8					4 15		W. T. Cox.
	4	Winslow,		7		10	Incendiary,		4 25		W. T. Cox.
April	5	Winslow,		2		10		R. & F. C. R. R.,	3 50		W. T. Cox.
	8	Winslow,		15		30		R. & F. C. R. R.,	7 55		W. T. Cox.
	16-17	Winslow,		40		80		R. & F. C. R. R.,	7 15		W. T. Cox.
	18	Winslow,		40		263		Incendiary,	8 05		W. T. Cox.
	18	Winslow,		100	$362	362		P R. R.,	27 25		W. T. Cox.
	18-19	Winslow,		40		200	Mine fire,		6 55		W. T. Cox.
	18-19	Winslow,		80		160	Incendiary,		17 20		W. T. Cox.
	18-19	Henderson,		100		300		Incendiary,	19 15		W. T. Cox.
	21	Winslow,		30		150		R. & F. C. R. R.,	15 20		W. T. Cox.
	23	Big Run Borough,		10		20			5 35		W. T. Cox.
	25	Pine Creek,		30		168		Boys,	8 80		W. T. Cox.
	26	Winslow,		40	5	405		R. & F. C. R. R.,	6 10		W. T. Cox.
	27	Pine Creek,		175		500			15 25		W. T. Cox.
	29-30	Winslow,		113		490	Incendiary,		24 90		W. T. Cox.
May	2-4	Winslow,		4		16			6 05		W. T. Cox.
	5	Pine Creek,		100		340	Incendiary,		22 45		W. T. Cox.
				941	$367	$3,514			$211 90		

JUNIATA COUNTY

April	3-6	Turbett,		200		$100	Traction engine,		$6 20		J. F. Reisinger.
	8	Susquehanna,		25		250	Burning brush,		8 61		H. C. Klinger.
	9	Monroe,		12	$40	90			11 75		J. Z. Strauser.
	19-22	Beal,		140		250			80 25		C. M. McMeen.
Nov.	2-3	Lack,		6				Hunters,	6 55		C. Lauthers.
Dec.	12	Milford,		20					7 15		C. M. McCahan.
				403	$40	$690			$120 51		

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

LACKAWANNA COUNTY.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
Mar. 3-4	Archbald Boro.,		3		$3	Mine engine,		$15 85		P. F. Gallagher.
April 14 15 16 20 25 28	Ransom,		100		200			23 50		H. J. Beagle.
18-19	Ransom,		150					10 60		H. Frost.
25-27	Carbondale,		600		10			34 65		A. J. Robinson.
30						W. B. C. E. R. R.				
30	Spring Brook,		250		500	W. B. C. E. R. R.		28 40		J. W. Haines.
30						W. B. C. E. R. R.				
30							Incendiary.			
May 30	Jefferson,		25		350	Incendiary,		8 95		J. P. Moore.
Oct. 30	Covington,		30		200			11 40		F. Larnerd.
Nov. 2	Ransom,		60					5 85		H. J. Beagle.
			1,218		$1,263			$139 20		

LANCASTER COUNTY.

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
Mar. 29	Penn,		50			Cornwall R. R.,		$7 95		J. H. Boyer.
April 9	East Earl,		1,500		$7,000			86 55		M. H. Grube.
14	West Donegal,								$32 25	J. S. Daveler.
18	Elizabeth,		606			Smoker,		90 63		C. G. Enck.
22	Elizabeth,		100					8 55		I. Horst.
Nov. 1	Salisbury,		1	$4	10	Hunters,				P. J. Bair.
			2,257	$4	$7,010			$193 68	$32 25	

LAWRENCE COUNTY.

Nov. 1	Taylor,		6	$20	$100		Hunters,	$6 80		J. R. Wright.
11	Taylor.		4	7	107		Hunters,	6 25		J. R. Wright.
			10	$27	$207			$13 05		

LEBANON COUNTY.

Mar. 29	Union,		2			P. & R. R. R.,		$3 07		H. L. Felty.
31						S. & S. R. R.,				
April 1	Union,		4,480			Previous fire,		198 14		H. L. Felty.
4	Cold Spring and					Previous fire,				
9	East Hanover,					Previous fire,				
8	Union,		30				S. & S. R. R.,	9 43		H. L. Felty.
8	Swatara,		12	$14	$219	Burning brush,		10 06		L. S. Moyer.
17	Cornwall,		35	200	550		Smoker,	11 35		Wm. Nelson.
	Cornwall,							174 80	$163 15	Wm. Nelson.
18-21	South Lebanon and		2,000	3,050	8,050	Flower pickers,		49 65	48 60	J. G. Stover.
	Heidelberg,							91 96	15 00	I Horst.
			6,559	$3,264	$8,819			$548 45	$226 75	

LEHIGH COUNTY.

April 1	Washington,		10					$3 30		J. Dorward.
7-8	Upper Saucon,		150	$20	$2,200	Burning brush,		60 25		J. J. Mory.
8-10	Lynn,		2,000		30,000			90 56		G. H. Rabert.
9	Washington,		4	10		L. V. R. R.,		25		J. Dorward.
9	Heidelberg,		1,000		1,000	Blasting,		25 10		J. Dorward.
14	Salisbury,		10				Smokers,	1 90		B. Scharles.
17	Lynn,		25		500	Incendiary,		10 28		G. H. Rabert.
19-20	Salisbury,		125				Burning brush,	25 10		R. Scharles.
19-22	Washington,		1,800		800		L. & N. E. R.R.,	80 85		J. Dorward.
25-27	Heidelberg,		120		500,	L. V. R. R.,		26 90		J. Dorward.
May 11	Lynn,		600	17	517			10 45		G. H. Rabert.
Nov. 10	Upper Saucon,		9		50	P. & R. R. R.,		3 53		J. J. Mory.
			5,853	$47	$35,567			$343 47		

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

LUZERNE COUNTY.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
Mar. 3	Shickshinny Boro.,	....	3	....	....	....	....	$9 05	....	G. B. Robbins.
4	Laurel Run Boro.,	....	8	....	$10	....	....	5 35	....	Geo. Bower.
27	Laurel Run Boro.,	....	10	....	15	....	....	4 50	....	Geo. Bower.
28	Foster,	....	80	....	100	L. V. R. R.,	....	7 75	....	R. Handlong.
Mar. 28	Wright and	....	....	....	....	....	Railroad,	....	....	
April 18	Fairview,	....	30	....	55	....	Railroad,	8 40	....	H. R. Williams.
2	Bear Creek,	....	100	....	....	L. V. R. R.,	....	7 75	....	A. F. Bond.
4	Duryea Boro.,	....	150	....	....	....	....	7 75	....	H. Frost.
5	Foster,	....	30	....	50	L. V. R. R.,	....	5 70	....	R. Handlong.
8	Foster,	....	90	....	400	Burning brush,	....	16 95	....	R. Handlong.
8-10	Salem,	....	175	....	1,750	....	....	85 85	....	G. B. Robbins.
9	Bear Creek,	....	300	....	....	....	Incendiary,	39 30	....	A. F. Bond.
10	Shickshinny Boro.,	....	2	....	....	....	....	5 85	....	G. B. Robbins.
11	Laurel Run Boro.,	....	20	....	25	....	....	10 65	....	Geo. Bower.
14	Conyngham,	....	25	....	....	....	....	4 75	....	N. W. Bloss.
15-16	Plymouth,	....	50	....	150	....	....	20 25	....	A. B. Warman.
16	Foster,	....	20	....	25	....	....	1 75	....	R. Handlong.
18	Jackson,	....	5	$16	75	....	....	16 50	....	C. W. Ehret.
18	Conyngham,	....	50	....	500	....	....	6 25	....	N. W. Bloss.
18	Laurel Run Boro.,	....	12	....	20	....	....	6 25	....	Geo. Bower.
18-19	Fairmount,	....	10	....	100	....	....	10 40	....	W. Blaine.
18-19	Conyngham,	....	100	....	1,000	....	....	15 60	....	N. W. Bloss.
19	Bear Creek,	....	150	....	....	L. V. R. R.,	....	81 75	....	A. F. Bond.
21	Wright,	....	700	....	1,000	....	....	19 15	....	F. Storm.
21-22	Bear Creek,	....	200	....	....	....	Incendiary,	47 75	....	A. F. Bond.
21-23	Duryea,	....	600	....	....	....	....	76 70	....	H. Frost.
22	Plymouth,	....	20	....	50	....	....	5 75	....	A. B. Warman.
22	Laurel Run,	....	395	....	....	....	....	21 25	....	Geo. Bower.
22-23	Bear Creek,	....	1,200	....	....	Incendiary,	....	35 25	....	A. F. Bond.
25	Foster,	....	5	....	....	L. V. R. R.,	....	8 30	....	R. Handlong.
25	Duryea Boro.,	....	15	....	....	....	....	5 60	....	H. Frost.
25	Foster,	....	100	....	$150	....	....	14 15	....	R. Handlong.

	25-27	Sugarloaf,		900	$1,600	5,000	Burning R. R. car.,		114 75		A. Lucki.
May	2	Laurel Run,							3 65		Geo. Bower.
	2	Duryea Boro.,		5					1 60		H. Frost.
	10-12	Sugarloaf and Hollenback,		400		3,000	Burning automobile,		62 40		A. Lucki.
	12-13	Buck,		200		800			36 75		Wm. Dutter.
	15	Union,		400		2,000	D. L. & W. R. R.,		21 85		N. B. Garrison.
June	6-7	Salem,		7					23 10		G. B. Robbins.
	9-10	Union,		5		15			10 60		G. B. Robbins.
Oct.	24	Plymouth,		18	12	48			9 34		A. B. Warman.
	24	Ransom,		90				Smoker,	5 90		H. E. Frost.
	29	Ransom,		25					4 04		H. E. Frost.
Nov.	1	Duryea Boro.,		35			Hunters,		3 79		H. E. Frost.
	2	Bear Creek,		50				Hunters,	30 50		A. F. Bond.
	3-4	Duryea Boro.,		45					5 59		H. E. Frost.
	6	Duryea Boro.,		8					79		H. E. Frost.
	6	Buck,		16		250			21 45		Wm. Dutter.
	7	Plymouth,		12		24			8 13		A. B. Warman.
	7	Duryea Boro.,		12					2 24		H. E. Frost.
	10	Duryea Boro.,		25					3 25		H. E. Frost.
	13	Buck,		125		700			39 50		Wm. Dutter.
	18	Bear Creek,		400			L. V. R. R.,		30 85		A. F. Bond.
	28	Plymouth,		10		15			3 78		A. B. Warman.
				7,437	$1,629	$16,327			$1,006 10		

LYCOMING COUNTY.

Mar.	15-16	Watson,		90		$175	Railroad,		$5 25		H. T. Harris.
April	4	Armstrong,		20		80	Railroad,		16 10		W. H. Manley.
	8-9	McIntyre,		150		300		Railroad,	3 25		E. W. Reed.
	8-9	Cummings,	40	10			E. R. R.,		18 80		H. C. Evans.
	8-9	Cummings and McHenry,	14	156			Railroad,		8 90	$97 00	H. C. Evans.
	9	Armstrong,		2		100	Burning brush,		4 50		W. H. Manley.
	12-13	Watson,		90		300	N. Y. C. R. R.,		5 25		H. T. Harris.
	15-20	McHenry,		50					9 25		H. C. Evans.
	15-22	Limestone,		*					20 07	19 20	E. H. Smith.
	17	Wolf,		20		100	Burning house,		8 55	6 20	W. Gray.
	18	Plunketts Creek,		20					5 90		T. B. Emick.
	18-21	McIntyre,		200		300			28 45	83 00	E. W. Reed.
	19-20	Watson,		300		200	N. Y. C. R. R.,		13 45		H. T. Harris.
	19-21	Cascade,		60		50			25 25		W. Moyer.
	19-26	McHenry,	300	3,000			Burning brush,		357 56	57 00	H. C. Evans.
	20	Shrewsbury,		27		25	Children,		13 80		J. W. Feister.
	21	McHenry,	400	30			N. Y. C. R. R.,		50 35		H. C. Evans.
	21-22	Watson,		200		100	Logging engine,		6 25		H. T. Harris.
	21-25	McHenry,	1,200	40			N. Y. C. R. R.,		156 05	82 00	H. C. Evans.
	21-27	Watson and Cummings,					Burning brush,		60 80		H. C. Evans.
	22	Limestone,		500					14 90		C. L. Buss.
	22-23	McIntyre,		150		500		Fishermen,	22 35		E. W. Reed.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

LYCOMING COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
25	Loyalsock,		5	$75	75			10 17		W. T. Crider.
25	Armstrong,		20		200	Incendiary,		12 00		A. P. Decker.
25–27	McNett,		200		300		Incendiary,	3 91	314 40	E. W. Reed.
26	Mill Creek,	500						14 50		C. E. Reeder.
26–27	Mill Creek,		150		500			11 15		W. Gray.
29	Armstrong,		500		500	Incendiary,		63 40		A. P. Decker.
May 15	Upper Fairfield,		12	2,500	2,500	Sawmill,		44 15	9 30	J. A. Bastian.
Oct. 23–24	Armstrong and Clinton,	200			200			46 00		W. H. Manley.
30–31	Lewis,		1.2							A. B. Wells.
Nov. 1–2	Cummings,		.3	200	201	Lumbering,		13 33	4 00	H. C. Evans.
1–3	McHenry,		50				Hunter,	6 27	8 80	H. C. Evans.
2–3	Lewis,	50	250		100			25 07	8 00	A. B. Wells.
13	Lewis,		†			Hunters,		1 15		W. W. Weis.
Dec. 11	Lewis,	†				Hunters,			40	A. B. Wells.
		2,704	6,303.5	$2,775	$6,806			$1,104 13	$689 90	

*Hundreds. †Incipient.

McKEAN COUNTY.

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
April 16 17–24 26 May 15 27	Sergeant,		20		$50	B. R. & P. R. R.,		$14 75	$7 50	D. O. Black.

MIFFLIN COUNTY.

Mar.	3	Armagh,	2			$1	L. & T. R. R.,			$ 90	C. R. Meek.
April	4	Derry,		350					$27 10	56 25	E. L. Mertz.
	8	Armagh,	20			25	P. R. R.,		5 43	10 85	C. R. Meek.
	9	Wayne,		5		50			13 15		S. C. Bardine.
	9-10	Derry,		150					15 81		E. L. Mertz.
	15	Derry,		100					12 85		E. L. Mertz.
	15-21	Brown and Granville,		800		2,000	K. V. R. R.,		387 80	184 20	J. Marker. E. L. Mertz. D. J. Hough.
	17-21	Wayne,		600		200			128 85		J. C. Dell. S. C. Bardine.
	19	Wayne,		25		250	Incendiary,		28 20		S. C. Bardine.
	25-26	Brown,		850		1,050			92 43		J. Marker. D. K. Warfield.
	25-27	Derry,		250					86 53		E. L. Mertz.
	26-27	Armagh,		700		2,600			63 65	34 00	D. K. Warfield.
	26-27	Oliver,		100			Burning brush,		21 92		D. F. Kirk.
	27-28	Oliver,		200		1,000	Burning brush,		18 00		D. F. Kirk.
May	11	Wayne,		3		12			5 45		A. R. McCarthy.
Nov.	1-2	Armagh,	115	35		300	Hunter,		42 80		D. K. Warfield.
	2-3	Oliver,		300	$50	250		Hunters,	39 30		D. F. Kirk.
			137	3,968	$50	$8,538			$968 85	$285 70	

MONROE COUNTY.

Mar.	4	Pocono,		25	$3	$50		Lumbermen,	$6 05		S. T. DeHaven.
	28	Coolbaugh,		.2			D. L. & W. R. R.,				G. H. Shaller.
	29-Apr. 1	Smithfield,		100				D. L. & W. R.R.	11 20		W. S. Lash.
April	5	Paradise,		1.5					50		G. H. Shaller.
	9	Stroud,		35		135	D. L. & W. R. R.,		6 10		J. L. Strobeck.
	9	Paradise,		5		15	Railroad,				C. Wilson.
	10	Barrett,		2		5		Smoker,	8 20		J. L. Strobeck.
	10	Middle Smithfield,		2		10	Burning brush,		1 13		J. L. Strobeck.
	14	Coolbaugh,		1				Railroad,	80		G. H. Shaller.
	14	Pocono,		.3		1		Railroad,			S. T. DeHaven.
	15	Smithfield,		6		25			4 60		C. Miller.
	16	Hamilton,		48		2,200	Burning brush,		36 15		W. S. Lash.
	16	Coolbaugh,		80		90			16 45		M. Possinger.
	16	Smithfield,		54		350			15 17		S. J. Mosler.
	17	Coolbaugh,		.2				Campers,			S. T. DeHaven.
	17	Paradise,		.5		4		Railroad,			C. Wilson.
	18	Coolbaugh,		100		125	D. L. & W. R. R.,		7 00		M. Possinger.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

MONROE COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
18	Barrett,		.3		2	Railroad,				C. Wilson.
18-20	Barrett, Price and Middle Smithfield,		2,500		4,000	Fishermen,		157 37		J. L. Strobeck.
19	Tunkhannock,		150					10 06		W. F. Herman.
20	Tunkhannock,		25				Clearing,	5 26		W. F. Herman.
21	Paradise,		12		12	D. L. & W. R. R.,		9 55		J. R. Fanseen.
21	Tunkhannock,		2,000		2,200		Sawmill,	33 59		M. Possinger. W. F. Herman.
21	Tunkhannock,		10		50	Burning pasture,		2 18		M. Possinger.
21-22	Hamilton,		500	10	2,100			53 15		H. G. Brewer.
22	Paradise,		4		50	Railroad,		1 80		G. H. Shaller.
22	Pocono,		1				Fishermen,	2 15		S. T. DeHaven.
24	Coolbaugh,		3		3			6 86		J. Learn.
25	Coolbaugh,		2,500		3,000			41 61		W. F. Herman. M. Possinger.
25	Barrett,		3,600		3,500		Fishermen,	15 55		J. L. Strobeck.
25-26	Middle Smithfield,		200		210			33 88		S. J. Mosier.
26-30	Pocono, Tunkhannock and Chestnut Hill,		500				Fishermen,	73 95		J. K. Tittle. L. George.
27	Pocono,		24			Previous fire,		4 20		S. T. DeHaven.
May 8	Pocono,		6		6	W. B. & E. R. R.,		2 40		S. T. DeHaven.
10	Coolbaugh,		4		5			4 10		G. H. Shaller.
14	Pocono,		.2		1	W. B. & E. R. R.,				S. T. DeHaven.
20	Pocono,		.1			W. B. & E. R. R.,				S. T. DeHaven.
Oct. 24	Paradise,		4		20	Railroad,		1 35		G. H. Shaller.
Nov. 12-15	Delaware Water Gap,					Burning hotel,		26 60	5 55	E. C. Wallace.
18	Tobyhanna,		.5		2	Railroad,				S. T. DeHaven.
	Salaries of patrolmen during spring of 1915.							326 00		J. L. Strobeck.
	Salaries of patrolmen during fall of 1915.							300 25		J. L. Strobeck.

	Expenses of John L. Strobeck, District Forester.	....	....	....	....	....	....	43 58	....	J. L. Strobeck.
	One-half expenses of the Pocono Protective Fire Association, per W. R. Fisher, Secy.	....	....	....	....	....	....	14 51	....	W. R. Fisher.
		....	12,504.8	$18	$18,171			$1,283 10	$5 55	

MONTOUR COUNTY.

April 4	Liberty,	....	12	$150	$210	P. & R. R. R.,	....	$9 70	....	C. H. Diehl.

NORTHAMPTON COUNTY.

Feb. 20-21	Washington,	....	65	$150	$450	....	....	$21 23	....	L. Miller.
Mar. 22-23	Upper Mount Bethel,	....	190	....	500	....	....	64 83	....	L. Miller.
29-Apr. 1	Upper Mount Bethel,	....	200	....	....	D. L. & W. R. R.,	....	....	....	W. S. Lash.
April 18	Plainfield,	....	....	....	....	....	....	....	....	H. G. Brewer.
18	Bangor Boro.,	....	15	210	210	....	....	9 06	....	L. Miller.
19	Upper Mount Bethel,	....	108	75	275	....	....	11 81	....	L. Miller.
20	Lehigh,	....	15	....	300	Burning brush,	....	49 30	....	A. J. Andrews.
Nov. 8	Lehigh,	....	500	....	1,000	....	Hunters,	23 55	....	A. J. Andrews.
		....	1,093	$435	$2,735			$180 28	....	

NORTHUMBERLAND COUNTY.

April 1	Shamokin and Zerbe,	....	100	....	....	....	....	$4 50	....	A. H. Swank.
1-2	Zerbe,	....	600	....	$500	....	....	31 90	....	R. Machamer.
4	Snydertown Boro.,	....	13	....	....	P. & R. R. R.,	....	11 10	....	E. C. Wagner.
20	Zerbe,	....	300	....	....	....	....	37 25	....	A. H. Swank.
25-27	Washington and Little Mahanoy,	....	900	....	6,050	....	....	46 05	....	H. C. Heffelfinger.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

NORTHUMBERLAND COUNTY—Continued.

Date.		Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
			State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
	26-27	Zerbe and Little Mahanoy,		2,500	$340	5,340	P. & R. R. R.,		16 30		B. Machamer.
	27	Washington,		80					31 45		H. C. Heffelfinger.
Oct.	28-29	Washington,		60				Hunters,	12 45		H. C. Heffelfinger.
Nov.	1-3	Snydertown Boro.,		65		375		Hunters,	53 20		E. C. Wagner.
				4,618	$340	$12,265			$244 20		

PERRY COUNTY—Continued.

Date.		Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
Mar.	24	Center,		2	$5	$5	Railroad,		$2 30		S. G. Fry.
	28	Center,		3	33	36			7 80		S. G. Fry.
April	3-6	Saville,		375		375			14 85		J. F. Reisinger.
	4	Millerstown Boro.,		12		55			15 15		J. R. Wright.
	4-5	Saville,		400	11	1,000			37 55		S. G. Fry.
	6-8	Miller,		155		800			86 30		S. G. Fry.
	8	Saville,		10		100	Logging engine,		7 50		J. F. Reisinger.
	8-9	Liverpool,		40		200			33 90		G. Long.
	8-9	Toboyne,		30		15	Burning brush,		19 52		D. W. Sheaffer.
	9	Carroll,		5		30	Burning brush,		8 06		J. Baxter.
	9	Center,		5		60	Railroad,		18 90		S. G. Fry.
	9-10	Buffalo and Watts,		500		2,200			187 65		S. I. Rhoads.
	14	Madison,		50		250	Clearing,		9 30		M. G. Hench.
	15	Greenwood,		30		10			6 25		J. R. Wright.
	19	Watts and Buffalo,		50		50			6 35		A. R. Thompson.
	19	Center,		5		25	Railroad,		4 10	$3 20	S. G. Fry.
	21-22	Toboyne,	1,150			300		Incendiary,	22 02		E. P. Hassinger.

	22	Toboyne,	100			35			19 70		C. H. Burk.
	24	Tyrone,		150					12 65		B. F. Lightner.
May	11	Watts,		50					5 75		A. R. Thompson.
Oct.	25	Toboyne,		1.5					2 06		J. H. Ziegler.
	31	Tyrone,		75		50			8 80		B. F. Lightner.
	31– Nov. 3	Madison and Jackson,	900	450		675		Incendiary,	244 90		D. W. Sheaffer. B. F. Lightner. M. G. Hench.
Nov.	2	Watts,						Hunters,	8 50		A. R. Thompson.
	2–3	Madison,		75		75			34 55		M. G. Hench.
	2–3	Jackson,		50		100	Incendiary,		68 99		D. W. Sheaffer.
	3	Spring,					Hunters,		4 98		J. Baxter.
	5	Rye,		100					47 95		W. Heisley.
Dec.	1	Lower Mifflin,		100		25			5 05		B. F. Lightner.
			2,150	2,723.5	$49	$6,461			$951 40	$3 20	

PIKE COUNTY.

Mar.	28	Palmyra,		200		$10			$7 45		J. E. Avery.
	29	Delaware,		4			Burning house,		7 05		T. Shepherd.
	31	Lackawaxen,		100		500	Burning brush,		5 60		C. R. Rosencrance.
April	14	Dingman,		5		10	Burning brush,		85		J. W. Kiesel.
	15–16	Lehman,	30	20		100		Fishermen,	20 12	$1 65	J. Miller.
	16	Lackawaxen,		3		15			3 40	1 20	J. E. Avery.
	16	Blooming Grove,		700		1,800			18 85	8 40	J. E. Avery.
	17	Delaware,		80	$70		Burning brush,		8 55		T. Shepherd.
	17–18	Lackawaxen,		1,000		2,000			20 45		C. R. Rosencrance.
	18–20	Porter,	2,500	1,000	150	6,000	Fishermen,		220 31	68 40	J. L. Strobeck.
	19–20	Lackawaxen,		3,000	16	4,016			49 10		C. R. Rosencrance
	19–20	Porter,							16 80		T. Shepherd.
	20–21	Westfall,		1,800		2,000	Burning brush,		63 05		J. T. Quick.
	21	Lehman,		5		50	D. V. R. R.,		3 12		S. J. Mosier.
	21–22	Milford and Westfall,	800	1,500					99 80	1 95	S. L. Hunt.
	21–22	Shohola,		1,000		1,500			33 65		C. R. Rosencrance.
	21–23	Westfall,	2,000	1,200		2,500			23 05		J. T. Quick.
	22	Lackawaxen,		150					26 50	4 80	J. E. Avery.
	25	Green,		500		1,000			3 40		R. W. Stadden.
	25	Green,		2,900		3,000		Fishermen,	10 00	4 50	J. L. Strobeck.
	26–27	Dingman and Delaware,		75		750	Incendiary,		14 80		J. W. Kiesel.
	28	Delaware,		50				Incendiary,	18 17		T. Shepherd.
May	6	Shohola, Milford & Westfall,		*					51 90		H. Bradford.
	6–7	Palmyra,		150		150			25 30	2 00	J. E. Avery.
	10–11	Dingman,		125		375	Incendiary,		19 90	4 40	J. W. Kiesel.
	11	Lackawaxen,		125		175			20 39		W. L. Simonson.
	11	Lackawaxen,		300		500			19 40		C. R. Rosencrance.
	11–12	Lackawaxen and Shohola,		1,000	150	1,650			37 25		C. R. Rosencrance.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

PIKE COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
June 5-6	Blooming Grove,	675	25	...	1,837	Burning brush,	...	62 90	18 90	J. E. Avery.
Oct. 29	Lackawaxen,	...	75	...	100	...	...	16 15	75	W. L. Simonson.
Nov. 8	Greene,	...	1.5	...	...	Clearing,	...	1 60	90	T. H. Gilpin, Jr.
		6,155	16,893.5	$386	$30,038			$928 86	$117 85	

*Miles.

POTTER COUNTY.

April 9	Eulalia,	...	100	...	$50	...	...	$5 75	...	Emil Mosch.
12	Eulalia,	...	40	...	20	C. & P. A. R. R.,	...	4 95	...	B. A. Matteson.
13	Eulalia,	...	225	...	85	Burning brush,	...	20 20	$2 10	B. A. Matteson.
14-15	Eulalia,	...	75	...	18	C. & P. A. R. R.,	...	8 65	1 50	B. A. Matteson.
17-19	Stewardson,	20	...	...	10	...	Fishermen,	30 85	13 00	T. H. Golden.
18	Genesee,	...	20	...	20	...	...	5 25	...	A. B. Coller.
18-21	Galeton and Pike,	...	150	...	300	...	...	46 90	...	F. D. Leach.
18-22	Ulysses,	...	350	...	350	...	Fishermen,	53 90	4 00	R. L. Emerick. C. P. Ayres.
19-22	Sweden,	...	225	...	325	Burning brush,	...	29 50	...	C. F. Wells.
21	Gaines,	...	150	...	...	...	...	20 75	...	T. D. McCracken.
21	Summit,	...	2	...	...	...	...	2 75	...	A. O. Baker.
21-22	Allegheny and Hebron,	...	200	...	...	...	Burning brush,	18 70	...	E. Mosch.
21-23	Hebron,	...	150	...	75	...	...	13 25	...	M. A. Harvey.
24-25	Sweden,	...	300	...	250	...	...	18 60	...	A. W. Snyder.
24-25	Summit,	...	15	...	...	Burning brush,	...	11 55	...	A. O. Baker.
25	Wharton,	...	20	...	20	...	...	12 05	2 70	G. S. Perry.
25-26	Hector,	...	200	...	700	...	...	9 65	...	R. H. Loucks.

	25-27	Sweden and Ulysses,		2,000	$4,800	12,000			5 96 27 40 51 10		R. L. Emerick. D. R. Smith. C. F. Wells.
	28	Abbott,	6			12	Lightning,		23 75	4 20	H. C. VanHorn.
	28	Summit,		1			Fallow fire,		4 05		A. O. Baker.
	29-30	Portage,	4				Lightning,		4 00	2 40	W. B. Evans.
May	11	Sylvania,	35	15		25	Burning log heap,		18 00	4 00	P. H. Fox.
	11-14	Stewardson,	800	70		555	Burning brush,		43 25	21 90	E. S. Caldwell.
June	5-8	Wharton,		50		125	Burning brush,		18 85		C. O. Miller.
	12	Sharon,		100					4 65		J. C. Shoff.
	18	Summit,		2			Fallow fire,		2 75		A. O. Baker.
	18-19	Sylvania,		1.5			Lightning,		5 75		C. Pierce.
Oct.	24-25	Abbott,		12		18		Hunters,	11 50	3 00	A. Bratz.
			365	4,479.5	$4,800	$15,058			$524 25	$38 80	

SCHUYLKILL COUNTY.

Mar.	3	St. Clair Boro.,		15		$10	Railroad,		$24 25		T. Weiss.
	25	West Mahanoy,		10		80	Railroad,		1 75		W. Hoffman.
	26-27	East Norwegian,		10		7	P. & R. R. R.,		30 00		T. Weiss.
April	2	West Mahanoy,		100		200	Trespassers,		3 60		W. Heffner.
	4	Manheim,		25					9 65		L. Blankenhorn.
	8	West Mahanoy,		100		200			2 05		W. Heffner.
	8-9	East Norwegian,		18		700	P. & R. R. R.,		42 55		T. Weiss.
	18	West Brunswick,		70		1,050	L. V. R. R.,		37 75		F. Koenig.
	18	East Union,		2,900		29,000	P. & R. R. R.,		121 00		M. Houser.
	18	Ryan, Blythe and Schuylkill,		1,200		600	Fishermen,		52 75		A. Ellis.
	20										
	18-19	Union,		500		2,500	P. & R. R. R.,		92 35		J. P. Shoup.
	19	West Mahanoy,		50		100	Trespassers,		2 65		W. Heffner.
	19-20	East Norwegian,		25	$14	1,000	Railroad,		49 00		T. Weiss.
	20-23	Washington, Pine Grove,		2,000	1,000	15,000			127 85		S. Leisey.
		and Wayne,		4,000	6,000	60,000			63 43		H. W. Dietrich.
	21-22	Wayne,		23	600	4,000			22 45		H. W. Dietrich.
	22	West Brunswick,		400		1,200	P. & R. R. R.,		16 00		F. Koenig.
	28	Eldred,		50		350	Lightning,		12 35		C. B. Maurer.
	30	Wayne,		600	700	6,000		Railroad,	33 55		H. W. Dietrich.
May	17	Barry and Foster,		2,115		7,000	Incendiary,		157 55		C. B. Maurer.
July	19	Eldred,		30			Lightning,		18 80		C. H. Morgan.
Oct.	29	Butler,		30		100		Hunters,	5 75		J. J. Conner.
	29	New Castle,		20		1,000	P. R. R.,		26 50		T. Weiss.
Nov.	1	East Norwegian,		25		800	Railroad,		27 45		T. Weiss.
	3	Union,		5		1	P. & R. R. R.,		3 30		J. P. Shoup.
	11	Union,		8		200	P. & R. R. R.,		4 85		J. P. Shoup.
	15	Butler,		50		125	Railroad,		13 07		C. B. Maurer.
				14,879	$8,314	$131,223			$992 25		

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

SNYDER COUNTY.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
April 15	Franklin and Washington,	2,500	400		$15,000			$468 40		J. G. Reigle.
15	Perry and West Perry,	325	505		1,125	Burning brush,		159 00		L. Womer.
18								97 10		J. Z. Strauser.
16–21	Franklin and Washington,		175					20 35		J. G. Reigle.
Nov. 6	Perry,		.2					6 25		H. J. Helm.
		2,825	1,080.2		$16,125			$751 10		

SOMERSET COUNTY.

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
April 15	Jefferson,		15		$80	Burning brush,		$2 70		V. M. Bearer.
19	Somerset,		112	$544	2,544	Traction engine,		30 81		C. E. Shafer.
19	Fairhope,		150		150	B. & O. R. R.,		9 55	$4 80	R. C. Emrick.
19	Paint,		11		200			7 35		J. H. Hummel.
19	Shade,		1,200		800			19 37		J. H. Hummel.
19–20	Paint,		300		500			39 20		J. H. Hummel.
26	Somerset,		115		5,717	Railroad,		17 90		C. E. Shaffer.
May 11	Southampton and Northampton,		3		20			2 46		H. I. Troutman.
14	Lincoln,		10		30	Logging engine,		5 81	75	V. M. Bearer.
15	Lincoln,	.8			8	Burning brush,		5 90	75	V. M. Bearer.
19–20	Lincoln,		85		21	Logging engine,		4 07	90	V. M. Bearer.
19–20	Jefferson,	70			42	Logging engine,		8 29		V. M. Bearer.
Oct. 10–15	Conemaugh,		80		200			22 75	2 10	G. P. Benson.
28	Lincoln,	.1				P. W. & S. R. R.,			40	V. M. Bearer.
Nov. 1–2	Jenner,		60		175	B. & O. R. R.,		7 25		E. Gonder.
2	Jenner,		25		50		B. & O. R. R.,	5 23		V. M. Bearer.

2	Jefferson,		150		450	Logging engine,		7 20		N. G. Moore.
2	Lincoln,	?				P. W. & S. R. R.,			40	V. M. Bearer.
9	Jefferson,	?				P. W. & S. R. R.,			20	V. M. Bearer.
18	Southampton,		150		50		Smokers,	4 21		H. I. Troutman.
		78.1	2,406	$544	$10,987			$200 04	$10 30	

SULLIVAN COUNTY.

April 5	Cherry,		50			L. V. R. R.,		$4 00		C. W. Morter.
8	Cherry,		40			L. V. R. R.,		3 75		C. W. Morter.
9-10	Cherry,		75			L. V. R. R.,		9 50		C. W. Morter.
23	Laporte,		1			Railroad,		9 50		G. Gorman.
June 3	Lopez,								$900 00	J. L. Miller.
6	Colley,		5					16 00		J. L. Miller.
8	Laporte,		30					21 50		G. Gorman.
Nov. 3	Davison,		100			Hunters,		5 25		T. Fiester.
			301					$69 90	$900 00	

SUSQUEHANNA COUNTY.

April 9	Liberty,		20		$100	Boys,		$7 10	$3 75	W. Hollenbeck.
9	Great Bend,		10		20	E. R. R.,		3 05	2 40	W. Newman.
26-27	Oakland,		450		3,000			32 45		F. L. VanAntwerp.
May 28-30	Great Bend,		50		50			2 05	1 80	W. Newman.
			530		$3,170			$44 65	$7 95	

TIOGA COUNTY.

April 4	Morris,	40			$20		N. Y. C. R. R.,		$9 80	J. W. Keller.
13	Morris,		3		2	N. Y. C. R. R.,			2 20	J. W. Keller.
14-15	Morris,	30			15		N. Y. C. R. R.,	$3 85		J. W. Keller.
17-18	Duncan,	10			15	E. R. R.,		3 10	18 60	J. W. Keller.
17-18	Morris,		6		6	E. R. R.,		2 85	5 80	J. W. Keller.

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

TIOGA COUNTY—Continued.

Date.	Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
		State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
17-18	Delmar, ...	....	20	....	40	Children, ...	....	8 80	....	J. W. Keller.
19	Delmar, ...	....	2	....	4	....	....	....	2 40	J. W. Keller.
20-22	Ward, Union & Hamilton,	....	2,720	....	8,100	....	....	33 85	5 40	G. Higland.
20-22	Delmar, ...	25	....	....	40	N. Y. C. R. R., ...	....	21 80	50 80	J. W. Keller.
25	Morris, ...	....	1	....	1	N. Y. C. R. R., ...	....	....	60	J. W. Keller.
25	Morris, ...	....	.5	....	....	N. Y. C. R. R., ...	....	....	50	J. W. Keller.
26	Morris, ...	....	3	....	2	N. Y. C. R. R., ...	....	....	1 00	J. W. Keller.
May 15	Brown, ...	....	250	....	1,000	Burning brush, ...	....	7 60	....	J. W. Keller.
June 1-2	Morris, ...	....	50	....	150	Burning dwelling, ...	....	11 50	....	J. W. Keller.
Nov. 18	Deerfield, ...	....	50	....	60	....	....	5 95	....	C. S. Merrick.
	Expenses incurred in investigating fire wardens.	....	....	....	....	....	....	19 04	....	J. W. Keller.
	Expenses incurred in investigating fire wardens.	....	....	....	....	....	....	9 70	....	T. C. Harbeson.
		105	3,105.5	....	$9,455			$128 04	$97 10	

UNION COUNTY.

Date.	Township.	State forest.	Private land.	Damage to cut material, buildings, fences, etc.	Total damage.	Known.	Supposed.	From fire fund.	To individuals.	Fire Warden.
Mar 17	Hartley, ...	5	....	....	$3	P. R. R., ...	....	$2 05	$5 00	C. R. Meek.
April 8	Hartley, ...	....	5	....	100	P. R. R., ...	....	....	5 00	C. R. Meek.
9	Hartley, ...	80	100	....	320	P. R. R., ...	....	5 60	16 50	C. R. Meek.
9	Hartley, ...	....	100	....	....	....	....	21 25	....	J. C. Ruhl.
24	Hartley, ...	10	40	....	100	P. R. R., ...	....	3 65	15 30	O. R. Meek.
May 11	White Deer, ...	270	130	....	1,000	....	Fishermen, ...	60 47	12 00	R. B. Winter.
Oct. 31	White Deer, ...	....	150	....	175	....	Hunters, ...	32 05	6 00	H. S. Metzger.
Nov. 1	Hartley, ...	1	5	....	10	Hunter, ...	....	1 45	1 20	C. R. Meek.

3	Hartley,	20			20	P. R. R.,			$3 00	C. R. Meek.
6	Hartley,		20		100			1 15	1 50	C. R. Meek.
Dec. 12-13	Lewis,	1			15	Smoker,		16 15	60	J. C. Snyder.
		387	550		$1,848			$143 82	$66 30	

VENANGO COUNTY.

April 21	Sandycreek,		125	$50	$550			$14 98		J. Grinder.
Nov. 1	Sandycreek,		100		300			8 52		J. Grinder.
			225	$50	$850			$23 50		

WARREN COUNTY.

April 18	Cherry Grove,		40					$13 45		E. M. Farnsworth.
21-22	Triumph,		980		$1,030	P. R. R.		$103 75		C. T. Strite.
May 14	Cherry Grove,		75			T. V. R. R.,		9 55		E. M. Farnsworth.
			1,095		$1,030			$126 75		

WAYNE COUNTY.

April 14	Canaan,		40		$500			$31 00		F. W. Short.
18	Austin,		10		150		N. Y. & W. R.R.	13 35		J. L. Sherwood, Jr.
18-22	Canaan,		100		925		D. & H. R. R.,	106 25		F. W. Short.
21-22	Cherry Ridge,		300					46 45		G. W. Collins.
23	Cherry Ridge & Paupack,							36 55		G. W. Collins.
24	Cherry Ridge & Paupack,		200					43 05		G. W. Collins.
24-27	Paupack,		1,000		300	Incendiary,		104 35		C. A. Daniels.
25-26	Cherry Ridge & Paupack,							46 35		G. W. Collins.
25-29	Canaan,		500		5,000			94 25		F. W. Short.
26	Lake,		20		200			8 75		W. L. Swingle.
26	Paupack,		200		100			10 75		C. A. Daniels.
26-27	Cherry Ridge & Paupack,		200	$350				56 35		G. W. Collins.
			2,570	$350	$7,175			$597 45		

TABLE I. DETAILED STATEMENT OF FOREST FIRES IN 1915—Continued.

WESTMORELAND COUNTY.

Date.		Township.	Area Burned.		Damage to cut material, buildings, fences, etc.	Total damage.	Cause.		Cost of Extinction.		Fire Warden.
			State forest.	Private land.			Known.	Supposed.	From fire fund.	To individuals.	
April	7-8	Fairfield,		240	$60				$25 30	$4 95	W. M. Hare.
	8	Ligonier,		75		$50	Clearing,		4 01		W. H. Lowry.
	9	Ligonier,	50	100		200	P. W. & S. R. R.,		23 77		W. H. Lowry.
	9	East Huntington,		23	15	55			3 30		E. C. Myers.
	9-10	Derry,		1,000			Burning brush,		42 75	1 50	J. C. Dalton.
	9-10	Cook,	20	100		120	P. W. & S. R. R.,		40 66	4 50	V. M. Bearer.
	15	Ligonier,		25		25	P. W. & S. R. R.,		28 65		V. M. Bearer.
	15	Cook,		20		40	Burning brush,		2 95		V. M. Bearer.
	18	Derry,					P. R. R.,		30 70	57 40	C. J. Dalton.
	18-21	Fairfield,		1,490					80 80		W. M. Hare.
	19	Donegal,		150		75		Railroad,	10 95		M. H. Lenhart.
	19	Unity,		50		110	Burning brush,		3 25		R. N. Johnson.
	25	Fairfield,		40			Lightning,		10 25		W. M. Hare.
	26	Donegal,		25		560	Burning brush,		9 40		E. C. Myers.
	28	Fairfield,		40					2 50		W. M. Hare.
May	4	Lymer,		1		5			2 67		W. H. Lowry.
	11-12	Unity and Cook,		150		575			19 00		R. N. Johnson.
	14	Fairfield,		4			Burning slab pile,		8 10		W. M. Hare.
	15	Fairfield,		85					15 85		W. M. Hare.
Oct.	25	Ligonier,		10		10		Hunters,	3 98		V. M. Bearer.
Nov.	1-2	Ligonier,		120		75		Incendiary,	12 60		V. M. Bearer.
	2	Cook,	.1				P. W. & S. R. R.,			20	V. M. Bearer.
	2-3	Ligonier,		350		350		Hunters,	28 92		V. M. Bearer.
	7	Cook,	.?				P. W. & S. R. R.,			20	V. M. Bearer.
	18	Fairfield,		10		100			10 55		J. Frain.
			70.1	4,058	$75	$2,350			$421 91	$68 75	

WYOMING COUNTY.

Mar. 18	Noxen,		80		$50		Children,	$9 85		F. C. Turner.
April 7	Noxen,		400	$8	308	L. V. R. R.,		19 45		F. C. Turner.
7-8	Noxen,		800			L. V. R. R.,		22 85		F. C. Turner.
8	Northmoreland,		75		2,000			43 00		H. K. VanTuyl.
8	Noxen,		200		100	Railroad,		4 55		G. W. Schenck.
21	Forkston and Noxen,		1,000	250		Burning rubbish,		151 15		F. C. Turner. O. R. Harding.
21	Northmoreland,		8		150	Burning brush,		25 50		H. K. VanTuyl.
22-23	Monroe and Noxen,		300		600			14 30		S. Jackson.
25	Falls,		25		600	Hunters,		13 50		H. K. VanTuyl.
May 11-12	Monroe and Noxen,		300		600			57 75		S. Jackson.
14-15	Monroe,		300	25	425		Incendiary,	37 80		S. Jackson.
June 3	Forkston,		*			Logging engine,		33 15		J. L. Miller.
6	Forkston,		900	1,600		Logging engine,		56 00		O. R. Harding.
Nov. 8	Noxen,		80		100			10 40		F. C. Turner.
			4,468	$1,883	$4,933			$499 25		

*Several hundred.

YORK COUNTY.

Feb. 22	North Codorus,		12			N. C. R. R.,		$4 15		L. W. Feistel.
Mar. 28	Hellam,		75	$200	$600	Lightning,		15 58		F. W. Ream.
30	Peach Bottom,		3	9	19			7 75		J. E. Wiley.
April 10	North Codorus,		5		23	Burning brush,		7 53		L. W. Feistel.
10	York,		6			N. C. R. R.,		3 30		L. W. Feistel.
14	Fawn Grove,		4		25	Burning brush,		5 30		J. W. Brooks.
15	Monaghan,		3	6	20	Burning rubbish,		4 20		J. A. Laird.
16	Peach Bottom,		.5	10	10		Smoker,	2 50		J. E. Wiley.
16	Heidelberg,		3	10	110	Burning brush,		6 14		H. S. Shue.
19	North Codorus,		5		40	N. C. R. R.,		3 75		L. W. Feistel.
20	Peach Bottom,		35	85	285	Burning brush,		10 75		J. E. Wiley.
20-21	Monaghan & Warrington,		50	100	350	Burning brush,		17 40		J. A. Laird.
21	Fawn Grove,		5	25	100	Burning fodder,		2 30		J. W. Brooks.
			206	$445	$1,582			$89 55		

TABLE II. SUMMARY BY CAUSE, AREA, DAMAGE, AND COST OF EXTINCTION.

County.	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.	Total.	Area.		Total damage.	Cost of Extinction.	
										State forest.	Private land.		From fire fund.	To individuals.
Adams,			3					1	4	1.540		$5,985	$76 22	$51 01
Allegheny,														
Armstrong,	1			2				6	9		377	2,850	82 50	7 50
Beaver,														
Bedford,	7	9	7	9	3	1		3	39	125	6,324	11,049	969 49	
Berks,	9	2	1					6	18		3,255	24,850	497 81	
Blair,	2	3		1	3	1	1	7	18		3,363	6,688	317 82	158 25
Bradford,	1	2	3			1		1	7		958	2,227	64 10	
Bucks,	1						1		2		65	650	5 75	
Butler,														
Cambria,	4		3					10	17		2,253	2,313	351 82	1 80
Cameron,	2	2	13					4	21	1 410	2,759	6,265	327 87	
Carbon,	17	1		4				16	38		6,696	42 007	628 02	41 95
Centre,	24	8	10	12	3	1	6	21	85	2,406	25,712	52,527	2,288 90	206 55
Chester,								2	2		8	153	43 43	
Clarion,	1	2	1			1		4	9		727	774	279 90	
Clearfield,	10	4	3	14	2	2		22	57	25	14,682	19,724	1,477 65	9 10
Clinton,	17	3	11	11			1	16	59	13,275	56,789	93,047	2,247 62	509 52
Columbia,		2	2				2	2	8		3,483	12,885	248 55	
Crawford,														
Cumberland,	2	3	5	2			3	8	23	5,550	13.496	117,575	811 46	116 05
Dauphin,	36	1		8	2		1	9	57	2,000	11,516	25,045	1,127 28	109 05
Delaware,														
Elk,	5	1	2			1		5	14	135	4,088	6,055	872 46	14 00
Erie,														
Fayette,		1	3	3				10	17		2,334	3,423	207 06	
Forest,		1							1		2,266	7	77 65	
Franklin,	1	3	23	5		3	5	25	65	502	5,745	7,875	1,045 13	168 02
Fulton,		1	2	2			1	2	8		4,682	6,466	312 88	23 70
Greene,														
Huntingdon,	4	5	3	9	2	1	1	10	35	17	10,750	36,088	812 15	10 35
Indiana,	1								1		136	304	29 95	
Jefferson,	7		6	1			1	4	19		941	3,514	211 90	
Juniata,		1		1			1	3	6		403	690	120 51	
Lackawanna,	3		2				1	10	16		1,218	1,268	139 20	
Lancaster,	1	1		2				2	6		2,257	7,010	193 68	33 35

Lawrence,	......	......	......	2	......	......	......	......	2	....	10	207	13 06	....
Lebanon,	3	1	......	1	......	......	4	......	9	....	6,559	8,319	548 45	226 75
Lehigh,	4	2	1	1	......	......	1	3	12	....	5,853	35,567	343 47	....
Luzerne,	10	1	3	3	......	......	1	36	54	....	7,437	16,327	1,006 10	....
Lycoming,	9	3	3	5	3	......	1	12	36	2,704	6,303	6,806	1,104 13	689 90
McKean,	5	......	......	......	......	......	......	......	5	....	20	50	14 75	7 50
Mercer,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Mifflin,	8	2	1	2	......	......	......	9	17	137	3,968	8,588	963 85	285 70
Monroe,	16	4	......	6	2	......	2	10	40	....	12,506	18,171	1,263 10	5 55
Montgomery,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Montour,	1	......	......	......	......	......	......	......	1	....	12	210	9 70	....
Northampton,	1	1	......	1	......	......	......	5	8	....	1,098	2,735	180 28	....
Northumberland,	2	......	......	2	......	......	......	5	9	....	4,618	12,365	244 20	....
Perry,	3	3	3	2	1	......	......	17	29	2,150	2,724	6,461	951 40	3 20
Philadelphia,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Pike,	1	5	3	3	......	......	1	18	31	6,155	16,894	30,088	928 86	117 85
Potter,	2	9	......	3	......	3	......	11	28	365	4,480	15,058	524 25	58 80
Schuylkill,	15	......	2	5	......	2	......	3	27	....	14,879	181,223	992 25	....
Snyder,	......	1	......	......	......	......	......	4	5	2,825	1,080	16,125	751 10	....
Somerset,	7	2	......	1	4	......	1	5	30	78	2,406	10,987	200 04	10 30
Sullivan,	4	......	......	1	......	......	......	3	8	....	301	7	69 90	900 00
Susquehanna,	1	......	......	1	......	......	......	2	4	....	530	3,170	44 65	7 95
Tioga,	9	1	......	1	......	......	1	3	15	105	3,105	9,455	128 04	97 10
Union,	5	......	......	4	......	......	......	2	11	387	550	1,843	143 82	66 30
Venango,	......	......	......	......	......	......	......	2	2	....	225	850	23 50	....
Warren,	2	......	......	......	......	......	......	1	3	....	1,095	1,030	126 75	....
Washington,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Wayne,	2	......	1	......	......	......	......	9	12	....	2,570	7,175	597 45	....
Westmoreland,	7	5	1	2	1	1	......	8	25	70	4,058	2,350	421 91	68 75
Wyoming,	3	2	1	2	2	......	......	4	14	....	4,468	4,933	499 25	....
York,	3	7	......	1	......	1	......	1	13	....	206	1,582	89 55	....
Total,	274	105	120	136	28	19	87	382	3,301	41,963	294,672	$850,777	$28,078 16	$4,004 75

TABLE II. SUMMARY BY CAUSE, AREA, DAMAGE, AND COST OF EXTINCTION.

County.	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.	Total.	Area.		Total damage.	Cost of Extinction.	
										State forest.	Private land.		From fire fund.	To individuals.
Adams,	......	......	3	......	......	......	......	1	4	1.540	....	$5,985	$76 22	$51 01
Allegheny,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Armstrong,	1	......	......	2	......	......	......	6	9	....	377	2,350	82 50	7 50
Beaver,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Bedford,	7	9	7	9	3	1	......	3	39	125	6,324	11,049	969 49	....
Berks,	9	2	1	......	......	......	......	6	18	....	3,255	24,850	497 81	....
Blair,	2	3	......	1	3	1	1	7	18	....	3,353	6,688	317 82	158 25
Bradford,	1	2	2	......	......	1	......	1	7	....	958	2,227	64 10	....
Bucks,	1	......	......	......	......	......	1	......	2	....	65	650	5 75	....
Butler,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Cambria,	4	......	3	......	......	......	......	10	17	....	2,253	2,313	351 82	1 80
Cameron,	2	2	13	......	......	......	......	4	21	1 410	2,759	6,265	327 87	....
Carbon,	17	1	......	4	......	......	......	16	38	....	6,696	42 007	628 02	41 95
Centre,	24	8	10	12	3	1	6	21	85	2,408	25,712	52,527	2,288 90	206 55
Chester,	......	......	......	......	......	......	......	2	2	....	8	153	43 43	....
Clarion,	1	2	1	......	......	1	......	4	9	....	727	774	279 90	....
Clearfield,	10	4	3	14	2	2	......	22	57	.25	14,682	19,724	1,477 65	9 10
Clinton,	17	3	11	11	......	......	1	16	59	13,275	56,789	93,047	2,247 62	509 52
Columbia,	......	2	2	......	......	......	2	2	8	....	3,433	12,885	248 55	....
Crawford,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Cumberland,	2	3	5	2	......	......	3	8	23	5,550	13,496	117,575	811 46	116 05
Dauphin,	36	1	......	8	2	......	1	9	57	2,000	11,516	25,045	1,127 28	109 05
Delaware,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Elk,	5	1	2	......	......	1	......	5	14	135	4,088	6,055	872 46	14 00
Erie,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Fayette,	......	1	3	3	......	......	......	10	17	....	2,334	3,423	207 06	....
Forest,	......	1	......	......	......	......	......	......	1	....	2,266	?	77 65	....
Franklin,	1	3	23	5	......	3	5	25	65	502	5,745	7,875	1,045 13	168 02
Fulton,	......	1	2	2	......	......	1	2	8	....	4,682	6,466	312 88	23 70
Greene,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Huntingdon,	4	5	3	9	2	1	1	10	35	17	10,750	36,088	812 15	10 35
Indiana,	1	......	......	......	......	......	......	......	1	....	136	304	29 95	....
Jefferson,	7	......	6	1	......	......	1	4	19	....	941	3,514	211 90	....
Juniata,	......	1	......	1	......	......	1	3	6	....	403	690	120 51	....
Lackawanna,	3	......	2	......	......	......	1	10	16	....	1,218	1,263	139 20	....
Lancaster,	1	1	......	2	......	......	......	2	6	....	2,257	7,010	193 68	32 25

Lawrence,	......	......	......	2	......	......	......	......	2	....	10	207	13 05	....
Lebanon,	3	1	......	1	......	......	4	......	9	....	6,559	8,819	548 45	226 75
Lehigh,	4	2	1	1	......	......	1	3	12	....	5,853	35,567	343 47	....
Luzerne,	10	1	8	3	......	......	1	36	54	....	7,437	16,327	1,006 10	....
Lycoming,	9	8	3	5	8	......	1	12	36	2,704	6,303	6,806	1,104 13	689 90
McKean,	5	......	......	......	......	......	......	......	5	....	20	50	14 75	7 50
Mercer,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Mifflin,	3	2	1	2	......	......	......	9	17	187	3,968	8,588	963 85	285 70
Monroe,	16	4	......	6	2	......	2	10	40	....	12,505	18,171	1,283 10	5 55
Montgomery,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Montour,	1	......	......	......	......	......	......	......	1	....	12	210	9 70	....
Northampton,	1	1	......	1	......	......	......	5	8	....	1,093	2,735	180 28	....
Northumberland,	2	......	......	2	......	......	......	5	9	....	4,618	12,265	244 20	....
Perry,	3	3	3	2	1	......	......	17	29	2,150	2,724	6,461	951 40	3 20
Philadelphia,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Pike,	1	5	3	3	......	......	1	18	31	6,165	16,894	30,088	928 86	117 85
Potter,	2	9	......	3	......	3	......	11	28	365	4,480	15,058	524 25	58 80
Schuylkill,	15	......	2	5	......	2	......	3	27	....	14,379	131,223	992 25	....
Snyder,	......	1	......	......	......	......	......	4	5	2,825	1,080	16,125	751 10	....
Somerset,	7	2	......	1	4	......	1	5	30	78	2,406	10,987	200 04	10 30
Sullivan,	4	......	......	1	......	......	......	3	8	....	301	?	69 90	900 00
Susquehanna,	1	......	......	1	......	......	......	2	4	....	530	3,170	44 65	7 95
Tioga,	9	1	......	1	......	......	1	3	15	105	3,105	9,455	123 04	97 10
Union,	5	......	......	4	......	......	......	2	11	387	550	1,843	143 82	66 30
Venango,	......	......	......	......	......	......	......	2	2	....	225	850	23 50	....
Warren,	2	......	......	......	......	......	......	1	3	....	1,095	1,030	126 75	....
Washington,	......	......	......	......	......	......	......	......	......	....	....	....	....	....
Wayne,	2	......	1	......	......	......	......	9	12	....	2,570	7,175	597 45	....
Westmoreland,	7	5	1	3	1	1	......	8	25	70	4,058	2,350	421 91	68 75
Wyoming,	3	2	1	2	2	......	......	4	14	....	4,468	4,933	499 25	....
York,	3	7	......	1	......	1	......	1	13	....	206	1,582	89 55	....
Total,	274	105	120	136	28	19	87	353	1,301	41,963	294,672	$850,777	$23,078 16	$4,004 75

TABLE III. SUMMARY BY MONTHS.

County.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Adams,	....	....	....	4	....	....	....	....	....	....	....	....	4
Allegheny,	....	....	....	....	....	....	....	....	....	....	....	....	......
Armstrong,	....	....	2	6	1	....	....	....	....	....	....	....	9
Beaver,	....	....	....	....	....	....	....	....	....	....	....	....	......
Bedford,	....	....	....	29	....	....	....	....	....	1	9	....	39
Berks,	....	....	8	6	2	....	....	....	....	1	....	1	18
Blair,	....	....	....	11	3	....	....	....	....	1	3	....	18
Bradford,	....	....	....	6	....	1	....	....	....	....	....	....	7
Bucks,	....	....	2	....	....	....	....	....	....	....	....	....	2
Butler,	....	....	....	....	....	....	....	....	....	....	....	....	......
Cambria,	....	....	....	12	3	1	....	....	....	....	1	....	17
Cameron,	....	....	1	18	1	....	....	....	....	1	....	....	21
Carbon,	....	1	7	25	3	1	....	....	....	1	....	....	38
Centre,	....	....	2	69	8	....	....	....	....	2	3	1	85
Chester,	....	....	....	1	1	....	....	....	....	....	....	....	2
Clarion,	....	....	....	5	4	....	....	....	....	....	....	....	9
Clearfield,	....	....	....	45	12	....	....	....	....	....	....	....	57
Clinton,	....	....	5	44	4	....	....	....	....	2	4	....	59
Columbia,	....	....	2	6	....	....	....	....	....	....	....	....	8
Crawford,	....	....	....	....	....	....	....	....	....	....	....	....	......
Cumberland,	....	....	1	19	....	....	....	....	....	....	3	....	23
Dauphin,	....	....	11	35	3	1	....	....	....	1	6	....	57
Delaware,	....	....	....	....	....	....	....	....	....	....	....	....	......
Elk,	....	....	....	12	1	1	....	....	....	....	....	....	14
Erie,	....	....	....	....	....	....	....	....	....	....	....	....	......
Fayette,	....	....	1	11	1	....	....	....	....	1	3	....	17
Forest,	....	....	....	1	....	....	....	....	....	....	....	....	1
Franklin,	....	....	10	28	1	....	....	....	....	1	22	3	65
Fulton,	....	....	....	6	1	....	....	....	....	....	1	....	8
Greene,	....	....	....	....	....	....	....	....	....	....	....	....	......
Huntingdon,	....	....	1	21	2	....	....	....	....	3	8	....	35
Indiana,	....	....	....	....	1	....	....	....	....	....	....	....	1
Jefferson,	....	....	3	14	2	....	....	....	....	....	....	....	19
Juniata,	....	....	....	4	....	....	....	....	....	....	1	1	6
Lackawanna,	....	....	1	12	1	....	....	....	....	1	1	....	16
Lancaster,	....	....	1	4	....	....	....	....	....	....	1	....	6
Lawrence,	....	....	....	....	....	....	....	....	....	....	2	....	2
Lebanon,	....	....	2	7	....	....	....	....	....	....	....	....	9
Lehigh,	....	....	....	10	1	....	....	....	....	....	1	....	12
Luzerne,	....	....	5	28	5	2	....	....	....	3	11	....	54
Lycoming,	....	....	1	27	1	....	....	....	....	2	4	1	36
McKean,	....	....	....	3	2	....	....	....	....	....	....	....	5
Mercer,	....	....	....	....	....	....	....	....	....	....	....	....	......
Mifflin,	....	....	1	13	1	....	....	....	....	....	2	....	17
Monroe,	....	....	3	30	4	....	....	....	....	1	2	....	40
Montgomery,	....	....	....	....	....	....	....	....	....	....	....	....	......
Montour,	....	....	....	1	....	....	....	....	....	....	....	....	1
Northampton,	....	1	2	4	....	....	....	....	....	....	1	....	8
Northumberland,	....	....	....	7	....	....	....	....	....	1	1	....	9
Perry,	....	....	2	17	1	....	....	....	....	3	5	1	29
Philadelphia,	....	....	....	....	....	....	....	....	....	....	....	....	......
Pike,	....	....	3	19	6	1	....	....	....	1	1	....	31
Potter,	....	....	....	21	2	4	....	....	....	1	....	....	28
Schuylkill,	....	....	3	16	1	....	1	....	....	2	4	....	27
Snyder,	....	....	....	4	....	....	....	....	....	....	1	....	5
Somerset,	...	....	....	7	5	...	....	....	....	2	6	....	20
Sullivan,	....	....	....	4	....	3	....	....	....	....	1	....	8
Susquehanna,	....	....	....	3	1	....	....	....	....	....	....	....	4
Tioga,	....	....	....	12	1	1	....	....	....	....	1	....	15
Union,	....	....	1	4	1	....	....	....	....	1	3	1	11
Venango,	....	....	....	1	....	....	....	....	....	....	1	....	2
Warren,	....	....	....	2	1	....	....	....	....	....	....	....	3
Washington,	....	....	....	....	....	....	....	....	....	....	....	....	......
Wayne,	....	....	....	12	....	....	....	....	....	....	....	....	12
Westmoreland,	....	....	....	15	4	....	....	....	....	1	5	....	25
Wyoming,	....	....	1	8	2	2	....	....	....	....	1	....	14
York,	....	1	2	10	....	....	....	....	....	....	....	....	13
Total,	....	3	84	739	94	18	1	....	....	34	119	9	1,101

TABLE IV. CLASSIFICATION OF FIRES BY ACREAGE.

County.	Less than 1 acre. Number.	Less than 1 acre. Acres.	1 to 100 acres. Number.	1 to 100 acres. Acres.	100 to 1,000 acres. Number.	100 to 1,000 acres. Acres.	More than 1,000 acres. Number.	More than 1,000 acres. Acres.	Total. Number.	Total. Acres.
Adams,	1	.5	1	40	2	1,500	......	....	4	1,540.5
Allegheny,	......	....	......	....	......	....	......	....	......	....
Armstrong,	......	....	9	377	......	....	......	....	9	377
Beaver,	......	....	......	....	......	....	......	....	......	....
Bedford,	2	.6	21	879	15	4,475	1	1,096	39	6,440.6
Berks,	1	1	15	474	1	500	1	2,280	18	3,255
Blair,	......	....	6	223	11	1,780	1	1,350	18	3,353
Bradford,	......	....	4	48	3	910	......	....	7	958
Bucks,	......	....	2	65	......	....	......	....	2	65
Butler,	......	....	......	....	......	....	......	....	......	....
Cambria,	......	....	10	353	7	1,900	......	....	17	2,253
Cameron,	......	....	13	590	8	3,579	......	....	21	4,169
Carbon,	1	.5	27	620	8	3,850	2	2,225	38	6,695.5
Centre,	6	2.7	43	1,578	28	11,100	8	15,440	85	28,120.7
Chester,	......	....	2	8	......	....	......	....	2	8
Clarion,	......	....	7	272	2	455	......	....	9	727
Clearfield,	......	....	33	1,162	21	9,145	3	4,400	57	14,707
Clinton,	3	2.5	26	1,032	18	5,780	12	63,250	59	70,064.5
Columbia,	......	....	4	233	3	1,200	1	2,000	8	3,433
Crawford,	......	....	......	....	......	....	......	....	......	....
Cumberland,	......	....	11	331	8	3,715	4	15,000	23	19,046
Dauphin,	2	1	35	932	17	5,583	3	7,000	57	13,516
Delaware,	......	....	......	....	......	....	......	....	......	....
Elk,	1	1	5	287	7	2,435	1	1,500	14	4,223
Erie,	......	....	......	....	......	....	......	....	......	....
Fayette,	......	....	11	405	6	1,929	......	....	17	2,334
Forest,	......	....	......	....	......	....	1	2,266	1	2,266
Franklin,	14	3.9	38	1,083	13	5,155	......	....	65	6,246.9
Fulton,	......	....	4	82	3	2,600	1	2,000	8	4,682
Greene,	......	....	......	....	......	....	......	....	......	....
Huntingdon,	3	1.2	23	446	5	1,620	4	8,700	35	10,767.2
Indiana,	......	....	......	....	1	136	......	....	1	136
Jefferson,	......	....	17	653	2	288	......	....	19	941
Juniata,	......	....	4	63	2	340	......	....	6	403
Lackawanna,	......	....	14	468	2	750	......	....	16	1,218
Lancaster,	1	1	3	150	1	606	1	1,500	6	2,257
Lawrence,	......	....	2	10	......	....	......	....	2	10
Lebanon,	......	....	4	79	......	....	5	6,480	9	6,559

TABLE IV. CLASSIFICATION BY ACREAGE—Contiued.

County.	Less than 1 acre.		1 to 100 acres.		100 to 1,000 acres.		More than 1,000 acres.		Total.	
	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.
Lehigh,	......	....	5	58	5	1,995	2	3,800	12	5,853
Luzerne,	......	....	39	1,142	14	5,095	1	1,200	54	7,437
Lycoming,	3	.4	15	517	16	3,950	2	4,540	36	9,007.4
McKean,	......	....	5	20	......	....	......	....	5	20
Mercer,	......	....	......	....	......	....	......	....	......	....
Mifflin,	......	....	7	255	10	3,850	......	....	17	4,105
Monroe,	11	4.3	21	550	4	1,350	4	10,600	40	12,504.3
Montgomery,	......	....	......	....	......	....	......	....	......	....
Montour,	......	....	1	12	......	....	......	....	1	12
Northampton,	......	....	3	95	5	998	......	....	8	1,093
Northumberland,	......	....	5	318	3	1,800	1	2,500	9	4,618
Perry,	......	....	22	793	5	1,580	2	2,500	29	4,873
Philadelphia,	......	....	......	....	......	....	......	....	......	....
Pike,	......	....	12	398	12	5,950	7	16,700	31	23,048
Potter,	......	....	17	524	10	2,320	1	2,000	28	4,844
Schuylkill,	......	....	19	664	4	1,500	4	12,215	27	14,379
Snyder,	1	.2	......	....	3	1,005	1	2,900	5	3,905.2
Somerset,	3	.1	10	307	6	977	1	1,200	20	2,484.1
Sullivan,	1	1	6	300	......	....	1	?	8	301
Susquehanna,	......	....	3	80	1	450	......	....	4	530
Tioga,	2	1.5	11	239	1	250	1	2,720	15	3,210.5
Union,	1	1	7	206	3	730	......	....	11	937
Venango,	......	....	1	100	1	125	......	....	2	225
Warren,	......	....	2	115	1	980	......	....	3	1,095
Washington,	......	....	......	....	......	....	......	....	......	....
Wayne,	......	....	4	170	8	2,400	......	....	12	2,570
Westmoreland,	3	1.1	13	357	8	2,280	1	1,490	25	4,128.1
Wyoming,	......	....	5	268	9	4,200	......	....	14	4,468
York,	1	.5	12	206	......	....	......	....	13	206.5
Total,	61	31	639	20,637	323	115,116	78	200,851	1,101	336,635

ROSTER OF FOREST FIRE WARDENS.

The list of forest fire wardens printed herewith is in accordance with the information at hand at the time the last proof was sent to the printer. Those wardens who have received certificates of appointment under the act of 1915 are indicated by the number in the first column. Those who have no number are still subject to the act of 1909. If a warden does not have a telephone in his residence or office, but can be reached through another party's 'phone, the latter is given.

Among those who have not as yet come under the new law, there may be some names which should not be listed, A number of the old wardens have not returned our Form 2, but we have not dropped them.

The Chief Forest Fire Warden will be glad to have his attention called to any errors in this list, He will also be very glad to have his attention called to any inefficiency or discourtesy on the part of any of the wardens.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA.

ADAMS COUNTY.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Franklin:					
80 James E. Carbaugh (R),	Orrtanna No. 2,	R. G. Conklin,	Fayetteville,	C. V.,	R. G. Conklin.
92 B. F. Hassler (R),	Fayetteville No. 2,	R. G. Conklin,	Fayetteville,	C. V.,	R. G. Conklin.
414 J. Edward Hall,	Orrtanna No. 2,	Henry Kimple,			R. G. Conklin.
Hamiltonban:					
134 Harry Staley (R),	Fayetteville No. 2,	L. E. Staley,	Fayetteville,	C. V.,	L. E. Staley.
433 Edward Strausbaugh,	Orrtanna,	633-E,	Gettysburg,	C. V.,	L. E. Staley.
Menallen:					
639 Ira P. Taylor,	Biglerville,	Ira P. Taylor,	Biglerville,	United,	J. R. Williams.
110 James W. McElwee (R),	Ortanna No. 2,	R. G. Conklin,	Fayetteville,	C. V.,	R. G. Conklin.
842 Peter Beamer,	Biglerville No. 2,	33-U,	Biglerville,	United,	J. R. Williams.
Calvin M. Black,	Aspers No. 2,	W. A. Black,	Biglerville,	Bell,	J. R. Williams.
Wm. J. Stover,	Biglerville No. 1,				J. R. Williams.

ALLEGHENY COUNTY.

Plum:					
E. K. Stough,	Unity Station No. 1,				Harrisburg.
Scott:					
B. F. Davis,	1430 Oliver Bldg., Pittsburgh.				Harrisburg.

ARMSTRONG COUNTY.

Apollo Borough:					
Dr. J. C. Hunter,	Apollo,				Harrisburg.
Applewood Borough:					
A. H. Semmens,	Kittanning,				Harrisburg.
Atwood Borough:					
J. D. McLean,	Atwood,				Harrisburg.

Bethel:					
Edw. R. Wolfe,	Kelly's Station,				Harrisburg.
Boggs:					
Guyer Kuhns,	New Bethlehem,				Harrisburg.
Burrell:					
J. E. Kinnard,	Cochran Mills,	190-R-5, 20-5,	Kittanning, Leechburg,	Bell, Local,	Harrisburg. Harrisburg.
Dayton Borough:					
Wm. Gallagher,	Dayton,				Harrisburg.
East Franklin:					
John McClay,	Kittanning No. 3,				Harrisburg.
Geo. H. Boltz,	Kittanning No. 3,				Harrisburg.
C. M. Richey,	Adrian,				Harrisburg.
Ford City Borough:					
J. B. McClelland,	Ford City,	84-J,	Ford City,	Kittanning,	Harrisburg.
Freeport Borough:					
James O. Ralston, Jr.,	Freeport,				Harrisburg.
Gilpin:					
W. Lindsey Patterson,	Leechburg,				Harrisburg.
Johnetta Borough:					
C. S. Helmick,	Johnetta,				Harrisburg.
Kiskiminetas:					
N. Ralph Fitzgerald,	Apollo No. 4,	15-R-22,	Apollo,	Kittanning,	Harrisburg.
Madison:					
W. E. Paine,	Tidal,	6-1,	Tidal,	Madison,	Harrisburg.
Frank Lorenz,	Rimer,	G. W. Clouse & Co., Rimerton.	Tidal,		Harrisburg.
Manor:					
John M. Huston,	Kelly Station,				Harrisburg.
Mahoning:					
Robert C. Orr,	New Bethlehem No. 4,	Julius Nelson,	Rural Line,	Mahoning,	Harrisburg.
North Buffalo:					
Wallace Claypool,	Kittanning No. 5,				Harrisburg.
Parks:					
John E. Lelless,	Dime,				Harrisburg.
Perry:					
Hiram J. Sedwick,	West Monterey,				Harrisburg.
Pine:					
O. B. Summers,	Templeton,	Templeton Pump Sta.		Bell,	Harrisburg.
Plum Creek:					
John Hotham,	Yatesboro No. 1,		(Graff or Gostown,	Local,	Harrisburg.
Rayburn:					
Charles A. Adams,	Kittanning,				Harrisburg.
Rural Valley Borough:					
J. C. Moore,	Rural Valley,				Harrisburg.
South Bethlehem Borough:					
W. W. Corbett,	New Bethlehem,				Harrisburg.
South Buffalo:					
Harry Ralston,	Freeport,				Harrisburg.
H. H. Irwin,	Freeport,				Harrisburg.
Sugarcreek:					
Samuel Shearer,	Worthington No. 1,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

ARMSTRONG COUNTY—Continued.

Township, Number, Name.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Valley:					
J. F. Rosenberger,	Kittanning No. 2,	J. A. Olinger,	Kittanning,		Harrisburg.
Washington:					
M. L. Painter,	Adrian,				Harrisburg.
Wayne:					
G. A. Stear,	Dayton,	G. A. Stear,	Rural Valley or Punxsutawney.	Bell, Bell.	Harrisburg.
West Kittanning Borough:					
W. G. Sedwick,	Kittanning,	513,	Kittanning,	Local,	Harrisburg.
Wickboro Borough:					
E. H. Shaffer,	Kittanning,				Harrisburg.

BEDFORD COUNTY.

Township, Number, Name.	Address.	Call.	Exchange.	Company.	Reports to.
Bedford:					
312 F. M. Agnew,	Wolfsburg,	F. M. Agnew,	Bedford,	Bell,	Wm. L. Byers.
311 James A. Heming,	Bedford No. 3,	Mrs. J. N. Drenning,	Cumberland Valley,	Bell,	Wm. L. Byers.
Bloomfield:					
310 Charles Snyder,	Bakers Summit,	A. Z. Pote,	Bakers Summit,		Wm. L. Byers.
Broad Top:					
309 James L. Tenley, Sr.,	Defiance,	J. L. Tenley,	Several,	Bedford and Fulton,	Wm. L. Byers.
308 George L. Foor,	Six Mile Run,	J. M. McIntyre & Co.		Both Phones,	Wm. L. Byers.
758 Samuel Ford,	Hopewell,	Penn Trading Co., Samuel Ford,		Both Phones. Bedford and Fulton,	Wm. L. Byers.
Colerain:					
11 Wm. L. Byers (F),	Rainsburg,	Wm. L. Byers,	Bedford,	Friends Grove,	Harrisburg.
133 Edward H. Smith (R),	Hopewell,	Diehl's Store,	Bedford,		Wm. L. Byers.
Cumberland Valley:					
466 Norman Bowman,	Cumberland Valley,	Jacob Nave,	Cumberland Valley,		Wm. L. Byers.
799 Clarence Anderson,	Cumberland, R. D., Md.	O. P. Bruner,		C. V.,	Wm. L. Byers.
835 Charles R. Drenning,	Bedford No. 3,	1-R-22,	Bedford,	Bell,	Wm. L. Byers.
East Providence:					
307 Sylvester Ritchey,	Everett No. 5,	5-R-14,	Breezewood,	McConnelsburg and Breezewood.	Wm. L. Byers.
306 E. M. Simpson,	Everett No. 4,	E. M. Simpson,	Breezewood,	Bell,	Wm. L. Byers.
East Saint Clair:					
305 D. W. Stambaugh,	St. Clairsville,		St. Clairsville,	Both Phones,	Wm. L. Byers.
301 J. S. Hoover,	Fishertown,	J. S. Hoover,		Bedford,	Wm. L. Byers.

Harrison:					
308 W. A. Carpenter,	Manns Choice No. 1,				Wm. L. Byers.
337 Howard Carpenter,	Manns Choice,		Manns Choice,	Either Phone,	Wm. L. Byers.
302 R. A. Long,	Buffalo Mills,	R. A. Long,	Bedford,	Bedford,	Wm. L. Byers.
571 Oscar G. Miller,	Buffalo Mills No. 1,	O. G. Miller,	Bedford,	Bell,	Wm. L. Byers.
Hopewell:					
351 Edgar R. Smith,	Hopewell,	E. R. Smith,	Loysburg,	Morrisons Cove,	Wm. L. Byers.
Juniata:					
359 Harvey E. Sides,	Manns Choice No. 1,				Wm. L. Byers.
570 H. K. McKinney,	Schellsburg,	H. K. McKinney,	Schellsburg,	Somerset,	Wm. L. Byers.
Kimmel:					
587 J. A. Finnegan,	Imler No. 1,	J. A. Finnegan,		Bell,	Wm. L. Byers.
King:					
301 A. R. Ickes,	Osterburg,	E. H. Hartle,		Bedford,	Wm. L. Byers.
324 Lloyd Fickes,	Imler,	V. A. Stufft,		Bell,	Wm. L. Byers.
		Central,	Imler,	County,	
Liberty:					
338 D. F. Workman,	Saxton,	Saxton Furnace,		Both Phones,	Wm. L. Byers.
Lincoln:					
300 A. H. Ling,	Alum Bank,	A. H. Ling,	Fishertown,	Bedford,	Wm. L. Byers.
299 John W. Rouzer,	Alum Bank,	J. W. Rouzer,	Imler,	Pavia and Imler,	Wm. L. Byers.
Londonderry:					
658 Ray Mays,	Buffalo Mills, No. 1,	Central,	Hyndman,	Bell,	Wm. L. Byers.
Mann:					
Frank Cavendar,	Artemas,	Wm. Elbins,	Everett,	Bell,	Wm. L. Byers.
Monroe:					
295 Erastus Diehl,	Chaneysville,	Marvin Pennel,	Clearville,	Bell,	Wm. L. Byers.
347 Joseph Barkman,	Everett No. 4,	Jos. Barkman,	Everett and Clearville.	Chapmans Run,	Wm. L. Byers.
Napier:					
390 William M. Sleek,	Schellsburg,	6-R-2,		Bell,	Wm. L. Byers.
569 L. J. Miller,	Schellsburg No. 1,	L. J. Miller,	Fishertown,	Farmers Mutual,	Wm. L. Byers.
Snake Spring:					
294 Dorsey M. Miller,	Everett No. 1,	D. M. Miller,		Bedford,	Wm. L. Byers.
293 Roy Miller,	Everett No. 4,	59,	Everett,	Bedford,	Wm. L. Byers.
322 Harvey Richey,	Everett No. 1,	D. H. Shuss,	Everett,	Bedford and Fulton,	Wm. L. Byers.
Southampton:					
292 Benjamin W. Iames,	Flintstone No. 1, Md.	B. W. Iames,	Clearville,	Bell,	Wm. L. Byers.
South Woodbury:					
443 George A. Mauk,	New Enterprise,	G. A. Mauk,	Loysburg,	Morrisons Cove,	Wm. L. Byers.
Union:					
390 Simon A. Feather,	Pavia,	Central,	Pavia,	Both Phones,	Wm. L. Byers.
291 J. H. Dibert,	Pavia,	Dibert's Store,		Both Phones,	Wm. L. Byers.
West Providence:					
290 R. W. Weicht,	Everett,	R. W. Weicht,	Everett,	Both Phones,	Wm. L. Byers.
West St. Clair:					
289 Morgan Prosser,	Alum Bank,				Wm. L. Byers.
Woodbury:					
288 B. R. Brumbaugh,	Martinsburg No. 1,	Cyrus H. Sell,		Morrisons Cove,	Wm. L. Byers.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

BERKS COUNTY.

Township, Number, Name.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
35 James E. McNeal (F),	616 Washington St., Reading.	2499,	Reading,	Bell,	Harrisburg.
Albany:					
401 Monroe W. Snyder,	Kempton,	Kempton House,	Kempton or Krumsville.	Both Phones,	J. E. McNeal.
Amity:					
766 Paul R. Guldin,	Yellow House,	10-2, 114-1,	Yellow House, Birdsboro,	Bell, Conestoga,	J. E. McNeal.
Bechtelsville:					
Wm. T. Ebst,	Bechtelsville,				J. E. McNeal.
Bethel:					
408 Jacob R. Meck,	Meckville,	36-R-11,	Myerstown,	Bell,	J. E. McNeal.
409 George Ebling,	Bethel,	Frank Ebling,	Frystown,	Bethel-Mt. Aetna,	J. E. McNeal.
Birdsboro Borough:					
B. Frank Knabb,	Birdsboro,				J. E. McNeal.
Centre:					
Henry E. F. Dietzle,	Centreport,				J. E. McNeal.
Cumru:					
743 Wm. G. Kohout,	Reading No. 1,	3014-R-14,	Shillington,	Bell,	J. E. McNeal.
District:					
407 Peter K. Sterner,	Alburtis No. 2,	Fredericksville, Hotel or Store.	Topton,	Mountain,	J. E. McNeal.
Douglas:					
642 Chas. L. Schultz,	Boyertown No. 2,	54,	Yellow House,	Bell,	J. E. McNeal.
715 Wm. B. Wisler,	Pine Forge,	20-21,	Yellow House,	Bell,	J. E. McNeal.
Earl:					
846 Oliver M. Mest,	Boyertown No. 1,	H. A. Mest,	Yellow House,	Manatawny,	J. E. McNeal.
Exeter:					
742 Victor L. Goodhart,	Stonersville,	V. L. Goodhart,	Reading and Birdsboro.	Bell and Conestoga,	J. E. McNeal.
Greenwich:					
699 Jonas Altenderf,	Klinesville,	19-6,	Krumsville,	Conestoga,	J. E. McNeal.
705 Albert F. Hein,	Lenhartsville,	932-R-4,	Hamburg,	Bell,	J. E. McNeal.
Heidelberg:					
Allison R. Speicher,	Wernersville,				J. E. McNeal.
Hereford:					
744 James E. Fox,	Macungie No. 2,	511,	Bally,		J. E. McNeal.
745 Adam L. Mensch,	Macungie No. 2,	61-5 or 64-3,		Bell,	J. E. McNeal.
Alfred G. Clemmer,	Clayton,				J. E. McNeal.
Jefferson:					
Adam H. Miller,	Host,				J. E. McNeal.

Kutztown Borough:					
Isaac L. DeTurk,	Kutztown,				J. E. McNeal.
Lower Alsace:					
Wm. J. Shearer,	Stony Creek Mills,				J. E. McNeal.
Maidencreek:					
406 O. B. Roberts,	Blandon,				J. E. McNeal.
Marion:					
796 Wm. A. Brumbach,	Stouchsburg,	Smaltz & Co.,		Consolidated,	J. E. McNeal.
Maxatawney:					
702 Solon L. Parkes,	Lyon Station,	Dr. M. H. Koch,	Topton,	Bell,	J. E. McNeal.
George L. Parkes,	Lyon Station,				J. E. McNeal.
Alvin Weisner,	Bowers,				J. E. McNeal.
Mount Penn Borough:					
Frank D. Yoder,	Mount Penn,				J. E. McNeal.
Muhlenberg:					
405 Nicholas H. Fisher,	Temple,	F. M. Adam,	Temple,	Bell,	J. E. McNeal.
Arthur F. Brown,	Temple,				J. E. McNeal.
Oley:					
700 F. D. Yoder,	Oley,	1111,	Yellow House,	Bell,	J. E. McNeal.
Ontelaunee:					
710 John S. Rothermel,	Leesport No. 1,	833,	Reading,	Consolidated,	J. E. McNeal.
Penn:					
703 Henry H. Hollenbach,	Bernville,	32,	Bernville,	Bethel-Mt. Aetna,	J. E. McNeal.
Pike:					
Harvey H. Weller,	Mill Church,				J. E. McNeal.
Reading City:					
845 George R. Logan,	Reading,	1410,	Reading,	Bell,	J. E. McNeal.
701 Herman A. Strohecker,	Reading,	H. D. Schaeffer,	Reading,	Bell,	J. E. McNeal.
Richmond:					
404 Milton D. Sollenberger,	Fleetwood No. 2,				J. E. McNeal.
730 Irvin Schlegel,	Virginville,	923-R-11,	Hamburg,	Bell,	J. E. McNeal.
John H. Heffner,	Lyon Station,				J. E. McNeal.
Robeson:					
413 Lott D. Evans,	Geigers Mills,				J. E. McNeal.
Rockland:					
788 Jacob Ruppert,	Lyon Station,				J. E. McNeal.
Ruscombmanor:					
704 Nic. K. Noll,	Fleetwood No. 1,	D. H. Manviller,	Fleetwood,	Consolidated,	J. E. McNeal.
Thos. M. Breidegam,	Fleetwood No. 2,				J. E. McNeal.
Sinking Spring Borough,					
403 A. L. Crouse,	Sinking Spring,	22-L,	Sinking Spring,	Bell,	J. E. McNeal.
Tilden:					
793 Daniel H. Bailey,	Hamburg No. 1,	W. G. Ebling,	Hamburg,	Bell,	J. E. McNeal.
Tulpehocken:					
767 Charles L. Moyer,	Mt. Aetna,	27-8,	Frystown,	Bethel-Mt. Aetna,	J. E. McNeal.
Union:					
711 Harry Church,	Monocacy,	103-3,	Birdsboro,	Conestoga,	J. E. McNeal.
Upper Bern:					
402 Samuel A. Berger,	Shartlesville,	S. A. Berger,	Bernville,	Bethel-Mt. Aetna,	J. E. McNeal.
843 A. J. Haag,	Shartlesville,	8-2-F,	Hamburg and Bernville,	Bell and Consolidated,	J. E. McNeal.
Upper Tulpehocken:					
729 Harry J. Paul,	Strausstown,	Farmers and Drovers Hotel,		Both Phones,	J. E. McNeal.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

BERKS COUNTY—Continued.

Township, Number, Name.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Washington:					
Henry M. Bauer,	Barto,				J. E. McNeal.
West Reading Borough:					
Daniel K. Hoch,	119 Walnut St., Reading.				J. E. McNeal.
Windsor:					
792 Adam S. Martin,	Hamburg,	Sanatorium,	Hamburg or Windsor		J. E. McNeal.
Womelsdorf Borough:					
741 John Y. Petticofer,	Womelsdorf,	50,	Womelsdorf,	Bell,	J. E. McNeal.

BLAIR COUNTY.

Township, Number, Name.	Address.	Call.	Exchange.	Company.	Reports to.
Antis:					
641 W. A. Keller,	Tyrone No. 2,	W. A. Keller,	Bellwood,	United,	Harrisburg.
John T. McClellan,	Tyrone No. 2,				Harrisburg.
Bellwood Borough:					
O. S. Fleming,	Bellwood,				Harrisburg.
Catharine:					
Wm. F. Hyle,	Williamsburg,	32-24-W,	Williamsburg,	United,	Harrisburg.
Charles W. Harpster,	Williamsburg No. 1,	C. W. Harpster,	Morrison Cove,	United,	Harrisburg.
Melvin Snively,	Isett,				Harrisburg.
G. W. Aurandt,	Williamsburg, R. D.				Harrisburg.
Duncansville Borough:					
Geo. W. Myers,	Duncansville,				Harrisburg.
Frankstown:					
646 Dr. J. A. Gold,	Frankstown,	J. H. Rodkey,	Hollidaysburg,	Bell and Phoenix,	Harrisburg.
Huston:					
David M. Fouse,	Drab,	D. M. Fouse,	Morrison Cove,	Morrison Cove,	Harrisburg.
Logan:					
643 Findley Anderson,	606 First Ave., Altoona.	Brush Mt.,	Motive Power,	Bell Motive Power,	Harrisburg.
848 H. E. Chamberlin,	Eldorado,	Shew & Co.,	Altoona,	Bell,	Harrisburg.
866 J. H. Winters,	Altoona,	250,	Altoona,	Bell,	Harrisburg.
872 R. L. Goetz,	Altoona,	2491X,	Altoona,	Bell,	Harrisburg.
645 C. F. Yost,	Altoona No. 1,	9956-R-3,	Altoona,	Bell,	Harrisburg.

North Woodbury:					
680 Arch Brumbaugh,	Martinsburg,	40-10-M,	Martinsburg,	United,	Harrisburg.
681 M. H. Kensinger,	Martinsburg No. 1,	40-3M,	Martinsburg,	United,	Harrisburg.
649 Earl N. Bowser,	Henrietta,	Geo. Baker,	Martinsburg,	Morrison Cove,	Harrisburg.
Snyder:					
J. B. Beam,	Tyrone,	Ice Plant at Barnett,			Harrisburg.
Taylor:					
650 C. E. Albright,	Roaring Springs,				Harrisburg.
Tyrone Borough:					
A. Lee Fleck,	Tyrone No. 1,	901-R-5,	Tyrone,	Bell,	Harrisburg.
Williamsburg Borough:					
Coleman Crotsley,	Williamsburg, Box 2				Harrisburg.

BRADFORD COUNTY.

Albany:					
885 A. H. Benjamin,	New Albany,	A. H. Benjamin,	New Albany,	New Albany,	T. C. Harbeson. Lloyd, Pa.
Armenia:					
886 T. A. Chapman,	Canton,	72J,	Armenia and Canton		T. C. Harbeson.
Asylum:					
906 J. G. Kerrick,	Towanda No. 7,	J. G. Kerrick,	Towanda and Standing Stone.	Independent,	T. C. Harbeson.
Barclay:					
887 John Kline,	Laquin,	John Kline,	Leroy,	Bell,	T. C. Harbeson.
Canton:					
888 Ulysses Bird,	Canton,	69-Y-X,	Canton,	Leroy and Canton,	T. C. Harbeson.
Columbia:					
889 Olen Bixby,	Sylvania,	Olen Bixby,	Sylvania,	Farmers,	T. C. Harbeson.
Franklin:					
890 C. R. Montgomery,	Canton,	15 A. T. Morse,	West Franklin,	Fairview Bell,	T. C. Harbeson.
Monroe:					
891 Geo. E. Morris,	Monroeton No. 1,	Elk Tannery Co.,	Powell,	Both Phones,	T. C. Harbeson.
Terry:					
892 J. L. Larrabee,	New Albany No. 45,	W. B. Bates,	Wyalusing,	Bell,	T. C. Harbeson.
Wyalusing:					
905 L. M. Elliott,	Wyalusing No. 2,	L. M. Elliott,	Camptown,	Campton & Herrick,	T. C. Harbeson.
893 W. E. Whispell,	Wyalusing No. 1,	J. N. Derby,	Wyalusing,	Independent,	

BUCKS COUNTY.

Buckingham:					
John Ewers,	Buckingham,	45-R-3,	Doylestown,	Bell,	Harrisburg.
East Rockhill:					
Jacob M. Detweiler,	Perkasie,	27-R-11,	Sellersville,	Bell,	Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

BUCKS COUNTY—Continued.

Township, Number, Name.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Haycock:					
John H. Landis,	Richland Centre,				Harrisburg.
Elmer S. Johnson,	Tohickon,	2-22 or 2-23,	Ferndale,	Bell,	Harrisburg.
Milford:					
U. G. Loux,	Geryville,				Harrisburg.
William Buck,	Finland,	72-12,	Pennsburg,	Bell,	Harrisburg.
Nockamixon:					
George A. Purdy,	Kintnersville,				Harrisburg.
Richland:					
Chas. E. Foulke,	Quakertown R. D.,				Harrisburg.
Springfield:					
W. B. Price,	Coopersburg No. 1,	10-3,	Coopersburg,	Bell,	Harrisburg.
			Springtown,	Bell,	
West Rockhill:					
Wm. W. Plank,	Sellersville No. 2,	J. D. Detwiler,	Sellersville,	Bell,	Harrisburg.
P. M. Frank,	Telford,				
Isaac S. Hetrick,	Sellersville No. 2,	106-5,	Sellersville,	Bell,	Harrisburg.

BUTLER COUNTY.

Allegheny:					
James Cobbett,	Parkers Landing No. 63.				Harrisburg.
Butler:					
Jerry A. Eberhart,	Butler,	6020-L,	Butler,	Peoples,	Harrisburg.
Buffalo:					
William Scott,	Sarver No. 19,				Harrisburg.
Clinton:					
J. B. Cunningham,	Cabot,				Harrisburg.
T. A. Bartley,	Saxonburg No. 21,				Harrisburg.
Joseph Jones,	Saxonburg No. 22,				Harrisburg.
Clearfield:					
P. B. Fennell,	Fenelton,	Central,	Fenelton,	Fenelton Independent,	Harrisburg.
Concord:					
Henry J. Clark,	Karns City, R. D.,				Harrisburg.
Forward:					
Solomon Dunbar,	Carr,				Harrisburg.

Jackson:					
F. B. Stiner,	Harmony,				Harrisburg.
Middlesex:					
Samuel A. Leslie,	Valencia No. 23,				Harrisburg.
Penn:					
Robert H. Harbison,	Butler No. 8,				Harrisburg.
Summit:					
John Biedenback,	Herman,				Harrisburg.
Venango:					
Amos Seaton,	Eau Claire,	37,	Eau Claire,	Peoples,	Harrisburg.

CAMBRIA COUNTY.

32 Walter D. Ludwig (F),	Johnstown,	Chamber of Commerce	Johnstown,		Harrisburg.
Adams:					
828 A. C. Baumgardner,	Elton,	J. E. Sauter,	Elton,	Johnstown,	W. D. Ludwig.
678 Samuel E. Jamison,	Dunlo,	Hennretta Supply or Coal Co. office.	Johnstown,	Bell,	W. D. Ludwig.
Allegheny:					
801 Edward Lenz,	Loretto,	Edw. Lents,	Loretto,	Loretto,	W. D. Ludwig.
Asheville Borough:					
Silas Gibbons,	Ashville,				W. D. Ludwig.
Bart:					
674 John Anderson, Sr.,	Marsteller,	John Anderson,	Ebensburg,	Farmers Line,	W. D. Ludwig.
Blacklick:					
728 E. B. Gotshall,	Expedite,	Domenic Rubbo, 47-R-21.		Bell,	W. D. Ludwig.
Carroll:					
677 Philip Hartzog,	Carrolltown,	P. Herzog,		H. & C.,	W. D. Ludwig.
A. H. Sharbaugh,	Carrolltown,				W. D. Ludwig.
Cambria:					
727 Benjamin Evans,	Ebensburg,	15-M,	Ebensburg,	Bell,	W. D. Ludwig.
Chest:					
655 C. F. Gill,	Flinton R. D.,	Philip Gill,	St. Lawrence,	United,	W. D. Ludwig.
652 Paul Smithbower,	Patton No. 1,	10-C.		N. Cambria Farmers,	W. D. Ludwig.
651 John Kline,	St. Lawrence,	John Kline,	Patton,	St. Lawrence Rural,	W. D. Ludwig.
757 Michael Kibler,	St. Lawrence,	Michael Kibler,	Patton,	St. Lawrence Rural,	W. D. Ludwig.
826 John Cosgrove,	Patton R. D.,	John Cosgrove,	Patton,	St. Lawrence,	W. D. Ludwig.
James A. McCans,	Patton,	100,		Farmers Line,	W. D. Ludwig.
Jacob Warner,	St. Lawrence,	Jacob Warner,		St. Lawrence Rural,	W. D. Ludwig.
Clearfield:					
653 J. C. McGough,	Dysart,	F. J. Nagle,		Farmers Line,	W. D. Ludwig.
Frank Warton,	Ashville,				W. D. Ludwig.
Cresson:					
827 Conrad Vincent Freidhof,	Summit,	R. G. Lutton,	Summit,		W. D. Ludwig.
Croyle:					
657 Michael F. McCall,	Summerhill,	Ambrose McCall,		Johnstown,	W. D. Ludwig.
714 Charles S. Stutzman,	Mineral Point No. 1.	88-R-11,		Bell,	W. D. Ludwig.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

CAMBRIA COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
East Taylor:					
654 Geo. C. Varner,	Conemaugh No. 1,	681-11,	Johnstown,	Bell,	W. D. Ludwig.
Elder:					
Lewis Blankenbicker,	Hastings,				W. D. Ludwig.
Ferndale Borough:					
R. W. Slagle,	Johnstown No. 4,				W. D. Ludwig.
Franklin Borough:					
J. R. Slates,	Conemaugh,				W. D. Ludwig.
Gallitzin:					
825 W. T. Reiley,	Coupon,	T. H. Myers,	Ashville,	Bell,	W. D. Ludwig.
Jackson:					
802 Grant S. Fresh,	Conemaugh No. 1,	Wm. Michaels,	Johnstown,		W. D. Ludwig.
Johnstown City:					
832 B. Y. Weller,	133 F St., Johnstown,	Brown & Leckey,		Johnstown,	W. D. Ludwig.
Lower Yoder:					
656 A. S. Evans,	Johnstown,	Frank Bowden,	Johnstown,	Bell,	W. D. Ludwig.
Middle Taylor:					
Ephraim Findley,	Johnstown No. 1,				W. D. Ludwig.
Patton Borough:					
Thomas J. Litzinger,	Patton,				W. D. Ludwig.
Portage Borough:					
William Sparks,	Portage,				W. D. Ludwig.
Portage:					
830 Raymond Itell,	Portage,		Portage,		W. D. Ludwig.
Richland:					
673 J. G. Cooper,	Johnstown No. 3,	H. D. Blough,	Johnstown,		W. D. Ludwig.
Reade:					
748 S. D. McCartney,	Blandburg,				W. D. Ludwig.
Sankertown Borough:					
C. G. Sharbaugh,	Cresson,				W. D. Ludwig.
Scalp Level Borough:					
Geo. W. Wilkinson,	Scalp Level,				W. D. Ludwig.
South Fork Borough:					
John Finn,	South Fork,				W. D. Ludwig.
Spangler Borough:					
I. N. Rodkey,	Spangler,				W. D. Ludwig.
Summerhill:					
679 Geo. G. Mulhollen,	Wilmore No. 2,	John E. Coleman,	Wilmore,	Bell,	W. D. Ludwig.
831 C. T. Settlemyer,	Wilmore,	2-R-3,	Wilmore,	Wilmore,	W. D. Ludwig.
Jacob Burkey,	Wilmore,	Wm. Himes-7-R-14,	Wilmore,	Wilmore Rural,	W. D. Ludwig.

Susquehanna:					
671 John H. Mechling,	Cherrytree No. 8,				W. D. Ludwig.
670 James Conners,	Hastings,			Beaver Run,	W. D. Ludwig.
Upper Yoder:					
675 Earl Keafer,	Johnstown No. 5,	James Hunt,		Johnstown,	W. D. Ludwig.
Washington:					
722 Michael Cassidy,	Lilly,	Lilly Bakery,			W. D. Ludwig.
D. H. Sharp,	Lilly,				W. D. Ludwig.
West Taylor:					
Edward Clark,	Johnstown No. 1,				W. D. Ludwig.
H. E. Rummel,	Johnstown,				W. D. Ludwig.
White:					
672 Albert McKee,	Flinton,	Gates store,	Patton,		W. D. Ludwig.
676 Herman Dishart,	Patton,	Herman Dishart,	Chest Springs,	Northern Cambria,	W. D. Ludwig.

CAMERON COUNTY.

Driftwood Borough:					
632 H. E. Coleman,	Driftwood,	Kreider's Store,		Driftwood,	H. E. Elliott.
Gibson:					
17 H. E. Elliott (F),	Sinnemahoning,	Crum's Store,	Emporium,	Bell,	Harrisburg.
25 W. H. Horning (F),	Sinnemahoning,	Crum's Store,	Emporium,	Bell,	Harrisburg.
82 R. M. Crum (R),	Sinnemahoning,	Crum's Store,	Emporium,	Bell,	H. E. Elliott.
72 C. M. Bailey (R),	Sinnemahoning,	C. E. Zerby,	Medix Run,	Bell,	H. E. Elliott.
669 O. B. Tanner,	Driftwood No. 1,				W. H. Horning.
787 S. W. Nyce,	Dents Run,				H. E. Elliott.
Grove:					
147 L. C. Wykoff (R),	First Fork,	L. C. Wykoff,		First Fork,	W. H. Horning.
315 Fred Caldwell,	First Fork,	Fred Caldwell,		First Fork,	W. H. Horning.
860 Charles F. Pitts,	Sinnemahoning,	Council's Store,	Emporium,	Bell,	H. E. Elliott.
Lumber:					
138 C. A. Swartz (R),	Sterling Run,	Sterling Run Store,		Bell,	W. H. Horning.
335 Clayburn E. Hooper,	Cameron,	Schwab Bros. Store,	Emporium,	Bell,	W. B. Evans.
Portage:					
20 W. B. Evans (F),	Sizerville,	902-12,	Emporium,	Bell,	Harrisburg.
Shippen:					
314 James E. Peasley,	Emporium,	Frank Kinsler,			W. B. Evans.
395 A. B. Doll,	Sizerville,	902-4,	Emporium,	Bell,	W. B. Evans.

CARBON COUNTY.

Banks:					
Foster M. Robinson,	Audenried,	105-J,	Hazleton,	Bell,	Harrisburg.
East Penn:					
James A. Kemmerer,	Ashfield,	81-R-42,	Lehighton,	Bell,	Harrisburg.
Amandus C. Ziegler,	Bowmanstown,				Harrisburg.
William H. Reber,	Bowmanstown, R. D.,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued

CARBON COUNTY—Continued

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
East Side Borough:					
Charles Moyer,	White Haven,				Harrisburg.
Franklin:					
894 Edwin D. Boyer,	Weissport,	15-7-W,	Lehighton,	Consolidated,	Strobeck.
895 Henry E. Neeb,	Lehighton No. 3,	4723,	Lehighton,	Consolidated,	Strobeck.
Kidder:					
388 C. H. Hofman,	White Haven,	J. R. Fox,	White Haven,		Strobeck.
391 Frank Wieder,	White Haven,	7-R-2,		Bell,	Strobeck.
588 Ira Getz,	Albrightsville,	John Snyder,	Jonas,	Consolidated,	Strobeck.
Lansford Borough:					
386 A. C. Neumiller,	Lansford,	Forester's office, L. C. & N. Co. Bldg.,	Lansford,	Bell,	McNeal.
Lower Towamensing:					
Daniel Mehrkam,	Palmerton,	C. R. R. of N. J. Sta.			Harrisburg.
Charles W. Green,	Bowmanstown,				
William Reph,	Danielsville,	Cubert Herman,	Danielsville,	Bell,	Harrisburg.
Mahoning:					
Edwin J. Lentz,	Bowmanstown No. 1,				Harrisburg.
Mauch Chunk Borough:					
737 J. Keith Esser,	Mauch Chunk,	136,	Mauch Chunk,	Bell,	McNeal.
Packer:					
R. J. Strunk,	Weatherly,				Harrisburg.
Charles Eroh,	Weatherly,				Harrisburg.
Penn Forest:					
374 Milton Altemose,	Albrightsville,	Milton Altemose,	Consolidated,	Penn Forest,	Strobeck.
Towamensing:					
896 John Neeb,	Lehighton No. 3,	47-22,	Lehighton,	Consolidated,	Strobeck.
Weatherly Borough:					
John Weigand,	Weatherly,				Harrisburg.

CENTRE COUNTY.

Boggs:					
728 Edward Reese,	Snow Shoe,	308-A,	Snow Shoe,	United,	G. W. Sheeler.
Burnside:					
95 Wm. C. Huff (R),	Westport,	F. H. Dutlinger,	Renovo,	Bell,	F. H. Dutlinger.
826 Winfield P. Meeker,	Clarence,	W. P. Meeker,	Snow Shoe,	Commercial,	G. W. Sheeler.
179 James Sankey,	Pine Glen,	Pine Glen P. O.,	Snow Shoe,	Commercial,	G. W. Sheeler.

Centre Hall Borough:					
3 Leonard G. Barnes (F),	Centre Hall,	31-3 or 31-5,	Centre Hall,	Bell,	L. G. Barnes.
280 J. C. Rossman,	Centre Hall,	2-3,	Centre Hall,	Bell,	Harrisburg.
Curtin:					
181 John A. Mann,	Orviston,	Orviston Supply Co.,		Commercial,	G. W. Sheeler.
850 R. J. Mann,	Howard,				G. W. Sheeler.
Ferguson:					
169 J. I. Reed,	Pine Grove Mills,	J. I. Reed,	State College,	Commercial,	J. W. Keller.
184 W. T. Wrye,	Warriors Mark No. 2,	5-3,	Warriors Mark,	Huntingdon & Centre,	J. W. Keller.
Gregg:					
396 L. P. Smith,	Spring Mills, R. D.,	221,	Spring Mills,	Bell,	C. R. Meek.
193 Wm. H. Weaver,	Spring Mills, R. D.,	11-4,	Spring Mills,	Bell,	C. R. Meek.
168 Domer C. Rachau,	Madisonburg,	Wm. E. Keller,	Spring Mills,	Bell,	C. R. Meek.
Haines:					
116 C. D. Motz (R),	Woodward,	Wolfe's Store,	Millheim,	Bell,	A. C. Silvius.
175 A. S. Stover,	Aaronsburg,	A. S. Stover,	Millheim,	Commercial,	C. R. Meek.
Half Moon:					
357 J. P. Eves,	Stormstown,	4-6,	Warriors Mark,	Huntingdon & Centre,	J. W. Keller.
Harris:					
29 J. W. Keller (F),	Boalsburg,	Boal Tavern,	State College,	Bell,	Harrisburg.
122 Robert Reitz (R),	Boalsburg,	David Bohn,	State College,	Bell,	J. W. Keller.
183 W. A. Leech,	State College,	E. W. Hess,	State College,	Commercial,	J. W. Keller.
172 J. H. Jacobs,	Boalsburg,	Dr. Kidder,		Both Phones,	J. W. Keller.
164 James W. Swabb,	Linden Hall,	72-R-5,	Centre Hall,	Bell,	J. W. Keller.
Howard Borough:					
156 Samuel Shay,	Howard,	Any phone,	Howard,		G. W. Sheeler.
Huston:					
R. R. Hartsock,	Julian,	H. K. Matterns,		Bell,	G. W. Sheeler.
177 Wilson Stiver,	Julian,	Roberts' Store	Martha,	Bell,	G. W. Sheeler.
Liberty:					
163 J. W. Coder,	Blanchard,	822,	Beech Creek,	Commercial,	G. W. Sheeler.
Marion:					
345 John W. Holmes,	Nittany No. 1,	W. I. Walizer,	Howard,		L. G. Barnes.
255 C. W. Bartley,	Zion,	907-3,	Bellefonte,	Bell,	L. G. Barnes.
Miles:					
167 Clement H. Gramly,	Rebersburg,	Exchange,	Rebersburg,	Bell,	C. R. Meek.
135 Leslie M. Stover (R),	Livonia,	17-R-2,	Millheim,	Bell,	R. B. Winter.
873 John L. Wolf,	Livonia,	L. M. Stover,	Millheim,	Bell,	R. B. Winter.
Milesburg Borough:					
188 Edward Quick,	Milesburg,	John Jodon, 86-J3,	Bellefonte,	Bell,	G. W. Sheeler.
Patton:					
203 Walter J. Stine,	Stormstown No. 1,	903-15,	Bellefone,	Bell,	J. W. Keller.
178 George B. Thompson,	State College,	488-13,	State College,	Bell,	J. W. Keller.
		127-A,	State College,	Commercial,	
Penn:					
36 Charles R. Meek (F),	Coburn,	4-5,	Millheim,	Bell,	Harrisburg.
354 E. I. Musser,	Millheim,	John Musser,	Millheim,		C. R. Meek.
Philipsburg Borough:					
260 L. E. Hess,	Philipsburg,	106-X,	Philipsburg,	Huntingdon & Centre,	G. W. Sheeler.
Potter:					
38 W. E. Montgomery (F),	Spring Mills, R. D.,	F. A. Carson,	Centre Hall,	Bell,	Harrisburg.
		W. H. Blauser,	Centre Hall,	Commercial,	
111 Wm. F. McKinney (R),	Spring Mills, R. D.,	W. F. McKinney,	Centre Hall,	Commercial,	W. E. Montgomery.
180 H. A. McClellan,	Tusseyville,	80-24,	Centre Hall,	Bell,	W. E. Montgomery.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

CENTRE COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Rush:					
209 Osborn P. McCord,	Philipsburg,				G. W. Sheeler.
194 Miles Hoover,	Sandy Ridge,	A. S. Cross,	Osceola Mills,		G. W. Sheeler.
372 George M. Pfouts,	Sandy Ridge,	Ridge Hotel,			G. W. Sheeler.
Snow Shoe:					
52 George W. Sheeler (F),	Snow Shoe,	Central,	Snow Shoe,	Both Phones,	G. W. Sheeler.
185 James F. Uzzell, Jr.,	Snow Shoe,	J. F. Uzzell,	Snow Shoe,	United,	G. W. Sheeler.
204 George McCartney,	Clarence,		Snow Shoe,	Commercial,	G. W. Sheeler.
684 George B. Uzzell,	Snow Shoe,	Washington House,	Snow Shoe,	United,	G. W. Sheeler.
Spring:					
165 Wm. R. Hoover (R),	Bellefonte No. 2,	68J-14,	Pleasant Gap,	Bell,	L. G. Barnes.
Union:					
187 Edward T. Hall,	Fleming,	913-32,	Bellefonte,	Bell,	G. W. Sheeler.
Walker:					
139 Wm. M. Harnish,	Mingoville,	F. W. Dunkle,		United,	L. G. Barnes.
136 W. E. Kessinger,	Nittany,	W. E. Kessinger,	Zion,	Nittany,	L. G. Barnes.
Worth:					
171 H. C. Woodring,	Port Matilda,	913-21,	Bellefonte or Tyrone,	Bell,	G. W. Sheeler.
525 John Kelley,	Port Matilda,	913,	Bellefonte,	Bell,	G. W. Sheeler.

CHESTER COUNTY.

Birmingham:					
James F. Sharpless,	West Chester, No. 6,				Harrisburg.
West Bradford:					
John E. Baldwin,	West Chester No. 8,	208-E,	West Chester,	United,	Harrisburg.
East Brandywine:					
George Cook,	Lyndell,				Harrisburg.
West Brandywine:					
T. E. Windle,	Coatesville No. 3,	F W. Sheppard,	Coatesville,	Bell,	Harrisburg.
Charlestown:					
H. C. Rowland,	Spring City,				Harrisburg.
East Coventry:					
Sumner Smith,	Parker Ford,				Harrisburg.

North Coventry:					
William Powell,	Pottstown No. 1,				Harrisburg.
Joseph M. Brown,	Pottstown No. 1,	Chas. Boyer,	Pottstown,	Bell,	Harrisburg.
Frank C. Coates,	Pottstown,	534-J-1,	Pottstown,	Bell,	Harrisburg.
S. F. Graham,	St. Peters No. 1,				Harrisburg.
East Goshen:					
Wm. D. Garrett,	West Chester, R. D.,	J. S. Garrett,	West Chester,		Harrisburg.
Honeybrook:					
Geo. E. Wilson,	St. Peters No. 3,				Harrisburg.
West Pikeland:					
H. C. Rowland,	Spring City,				Harrisburg.
Schuylkill:					
Eugene Raser,	Phoenixville No. 3,	Owen Raser,	Phoenixville,	Bell,	Harrisburg.
South Coventry:					
Earl J. Essick,	Saint Peters,	J. B. Chrisman, or C. M. James.	Pughtown,	Bell,	Harrisburg.
Arthur H. Essick,	Saint Peters,		Pughtown,	Bell,	Harrisburg.
Samuel L. Favinger,	Pottstown,	John W. Young,	Pughtown,	Bell,	Harrisburg.
Thornbury:					
Wm. D. Garrett,	West Chester, R. D.,	J. S. Garrett,	West Chester,		Harrisburg.
Tredyffrin:					
D. W. Conway,	Valley Forge,	J. F. Myers,	Phoenixville,	Postal,	Harrisburg.
Upper Uwchlan:					
Geo. E. Wilson,	St. Peters No. 3,				Harrisburg.
East Vincent:					
H. C. Rowland,	Spring City,				Harrisburg.
Wallace:					
Geo. E. Wilson,	St. Peters No. 3,				Harrisburg.
Warwick:					
Josiah H. Essick,	Saint Peters, R. D.,	Joseph Wonderlich,	Conestoga,		Harrisburg.
Westtown:					
Wm. D. Garrett,	West Chester, R. D.,	J. S. Garrett,	West Chester,		Harrisburg.
West Whiteland:					
Harry F. Dague,	Whitford,				Harrisburg.

CLARION COUNTY.

Callensburg Borough:					
A. B. Klingensmith,	Callensburg,	Central,			Harrisburg.
Clarion Borough:					
L. L. Himes,	Clarion,				Harrisburg.
Elk:					
John W. Thompson,	Shippenville,				Harrisburg.
Farmington:					
John McClellan,	Scotch Hill,				Harrisburg.
Highland:					
J. A. Potts,	Miola,				Harrisburg.
Hawthorn Borough:					
G. B. Dovenspike,	Hawthorn,	Dr. G. V. Hepler,		Bell,	Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

CLARION COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Knox:					
Thomas McLaughlin,	Lucinda,	John Ochs,	Redbank,		Harrisburg.
Limestone:					
Thomas D. Spence,	Limestone,	Store,	Clarion or New Bethlehem.		Harrisburg.
Madison:					
Robert F. Hunter,	Rimersburg No. 2,	R. M. Martin,		Farmers Phone,	Harrisburg.
Mill Creek:					
John Nicholson,	Sigel No. 2,	John Nicholson,	Clarion at Fisher,	Redbank Farmers',	Harrisburg.
Monroe:					
W. R. Gibson,	Reidsburg,	R. P. Hannah,	Clarion,	Leatherwood,	Harrisburg.
Paint:					
J. W. Young,	Shippensville,				Harrisburg.
A. W. Vowinckel,	Shippensville,				Harrisburg.
Wm. Brineman,	Shippensville,				Harrisburg.
Porter:					
W. B. Himes,	New Bethlehem,				Harrisburg.
Rimersburg Borough:					
W. A. Wick,	Rimersburg,				Harrisburg.
Strattonville Borough:					
H. Bird Wilson,	Strattonville,				Harrisburg.
Washington:					
B. F. Frill,	Newmansville, R. D.,	B. F. Frill,		Redbank,	Harrisburg.

CLEARFIELD COUNTY.

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to.
Beccaria:					
618 Daniel M. Spangler,	Rosebud,	W. S. Brady,	Rosebud,	C. & H.,	Wm. F. Dague.
Bell:					
735 Andrew McQuown,	Mahaffey,	13-R-3,	Mahaffey,	Bell,	Wm. F. Dague.
Bigler:					
617 Clark Hileman,	Madera,	Hileman House,	Madera,	Both Phones,	Wm. F. Dague.
Charles G. Gill,	Madera,				Wm. F. Dague.
Bloom:					
452 Mark W. Lines,	Grampian,	A. G. Dale,	Grampian,	Farmers (C. & H.),	Wm. F. Dague.

Boggs:					
553 Geo. B. Shugarts,	Clearfield No. 4,				Wm. F. Dague.
Bradford:					
630 James B. Graham,	Woodland, R. D.,	904-14,	Clearfield,	Bell,	Wm. F. Dague.
Brady:					
453 W. P. Wingert,	Luthersburg,	W. P. Wingert,	Luthersburg,	S. U. B.,	Wm. F. Dague.
Brisbin Borough:					
462 Thomas Lloyd,	Brisbin,	Thos. Lloyd,	Houtzdale,	H. & C.,	Wm. F. Dague.
Burnside:					
805 Harry C. Conner,	Burnside,		Burnside,	Both phones,	Wm. F. Dague.
623 James B. Stauffer,	Burnside,	John H. Patchins,	Burnside,	Both phones,	Wm. F. Dague.
Chest:					
465 R. V. McGarvey,	Westover,	R. V. McGarvey,	Ansonville,	C. & C.,	Wm. F. Dague.
Chester Hill Borough:					
533 Benj. Cowperthwaite,	Philipsburg,	P. & S. R. R. Sta.,		Both phones,	Wm. F. Dague.
Clearfield Borough:					
479 C. E. Hoover,	Clearfield,	328,	Clearfield,	H. & C.,	Wm. F. Dague.
458 Solomon Kline,	Clearfield,	Boyce's grocery,			Wm. F. Dague.
Cooper:					
551 Christ Hartle,	Drifting,				Wm. F. Dague.
J. O. Ollinger,	Drifting,				Wm. F. Dague.
Covington:					
445 W. F. Reiter,	Keewaydin,	W. F. Reiter,	Clearfield,	H. & C.,	Wm. F. Dague.
Ferguson:					
581 Blair Stevens,	Kerrmoor,	Blair Stevens,	Kerrmoor or Lumber City.	Farmers Line,	Wm. F. Dague,
624 Wm. Thurstin,	Kerrmoor,	Ferguson Store,			Wm. F. Dague,
Girard:					
78 W. J. Buck (R),	Odessa,	N. J. Mignot,	Clearfield,	H. & C.,	Wm. F. Dague.
444 Clement C. Billotte,	Frenchville,	Fred N. Liegey,	Clearfield,	H. & C.,	Wm. F. Dague.
626 Alfred Krise,	Odessa,	Alfred Krise,	Clearfield,	H. & C.,	Wm. F. Dague.
Glen Hope Borough:					
464 William Davis,	Glen Hope,	E. T. McNeal,	Ansonville,	C. & C.,	Wm. F. Dague.
Goshen:					
446 Moses Liegey,	Odessa,	Moses Liegey,	Clearfield,	H. & C.,	
447 Thomas J. Livergood,	Shawville,	Ira J. Kramer,		H. & C.,	Wm. F. Dague.
Graham:					
448 J. C. Hubler,	Morrisdale,				Wm. F. Dague.
449 L. H. Hubler,	Kylertown,	Kylertown,			Wm. F. Dague.
Greenwood:					
454 Lewis Haines,	Grampian No. 2,		Bells Landing,	H. & C.,	Wm. F. Dague.
Gulich:					
463 G. A. Harris,	Ginter,	Ginter Hotel,		Bell,	Wm. F. Dague.
Huston:					
30 Carl L. Kirk (F),	Penfield,	C. L. Kirk,	Penfield,	Bell,	Wm. F. Dague.
489 M. G. Hutchins,	Brockport,				C. L. Kirk.
609 Harry Frantz,	Tyler,	Harry Frantz,	Penfield,	Bell,	C. L. Kirk.
Jordan:					
26 James E. Bratton,	Ansonville,	Jas. Bratton,	Ansonville,	C. & C.,	Wm. F. Dague.
Karthaus:					
74 M. A. Barr (R),	Karthaus,	Dr. W. S. Gillilan,	Clearfield,	H. & C.,	
Knox:					
573 Parley Stott,	Olanta,	30-11,	Curwensville,	Bell,	Wm. F. Dague,

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

CLEARFIELD COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Lawrence:					
457 W. C. Goss,	Clearfield,	420,	Clearfield,	H. & C.,	Wm. F. Dague.
804 Jonathan Ogden,	Clearfield, R. D.,	Jonathan Ogden,	Clearfield,	H. & C.,	Wm. F. Dague.
Morris:					
456 Philip Sarowy,	Morrisdale,	Morrisdale Coal Co.,		Both Phones,	Wm. F. Dague.
Osceola Borough:					
460 Guy Sankey,	Osceola Mills,	Mat Askey,	Osceola Mills,	H. & C.,	Wm. F. Dague.
Penn:					
465 W. K. Danvir,	Grampian,	Reuben Hartzfelt,		Summerville,	Wm. F. Dague.
Pike:					
15 William F. Dague (F),	Clearfield,	288-2,	Clearfield,	H. & C.,	Harrisburg,
450 G. O. Goss,	Curwensville,	G. O. Goss,	Curwensville,	H. & C.,	Wm. F. Dague,
451 G. W. Anderson,	Curwensville, R. D.,	G. W. Anderson,	Curwensville,	H. & C.,	Wm. F. Dague.
Pine:					
117 John Nelson, (R),	Penfield,	John Nelson,	Penfield,	Bell,	Wm. F. Dague.
97 Frank Johnston (R),	Anderson Creek,	Frank Johnston,	Penfield,	Bell,	C. L. Kirk.
Sandy:					
459 George Beer,	Sabula,	Edson D. Hoyt,	Sabula,	Bell,	Wm. F. Dague.
593 James Kirk,	Sabula,	James Kirk,	DuBois,	Bell,	C. L. Kirk.
Woodward:					
461 Arch Moyer,	Olanta, R. D.,	30-22,	Curwensville,	Bell,	Wm. F. Dague.
550 T. E. Lawford,	Houtzdale, R. D.,				Wm. F. Dague.

CLINTON COUNTY.

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to.
Allison:					
James W. Gould,	Lock Haven,				J. B. Ryon.
Bald Eagle:					
435 H. A. Karchner,	Mill Hall,	24-31,	Mill Hall,	Commercial,	J. R. Hogentogler.
625 John Kirby,	Mill Hall No. 2,	90-43,	Lock Haven,	Bell,	J. B. Ryon.
778 John L. Bickel,	Mill Hall,	S. A. Wilt,	Mill Hall,	Bell,	J. B. Ryon.
Myron Gummo,	Beech Creek No. 1,				J. B. Ryon.
Beech Creek Borough:					
144 John Winkebleck (R),	Beech Creek,	Central,	Beech Creek,	United,	G. W. Sheeler.
Beech Creek:					
132 A. L. Shoemaker (R),	Beech Creek,	Central,	Beech Creek,	United,	G. W. Sheeler.

Castanea:					
400 John L. Harvey,	Castanea,	298-J,	Lock Haven,	United,	J. R. Hogentogler.
Chapman:					
14 Horace F. Critchley (F),	North Bend,	917-12,	Renovo,	Bell,	Harrisburg.
94 Charles A. Hemmerley (R),	North Bend,	917-12,	Renovo,	Bell,	H. F. Critchley.
434 Dayton VanSickle,	North Bend,	913-3,	Renovo,	Bell,	H. F. Critchley.
200 Vernon VanSickle,	North Bend,	B. F. Nuss,	Renovo,	Bell,	H. F. Critchley.
201 Michael Lopeman,	Gleasonton,	916-5,	Renovo,	Bell,	H. F. Critchley.
256 Elmer E. Felmlee,	Hyner,	Hyner Post Office,	Renovo,	Bell,	H. F. Critchley.
Colebrook:					
139 James F. Young,	Farrandsville,	H. W. Ref. Co.,	Lock Haven,	Bell,	J. B. Ryon.
Crawford:					
358 Harvey Lehman,	Carroll,	J. W. Lehman,	Loganton,	Commercial,	H. S. Metzger.
198 C. C. Fetterhoof,	Jersey Shore, R. D.,	1243,	Oriole,	Commercial,	J. R. Hogentogler.
Dunstable:					
667 Elmer Deise,	Lock Haven,	910-6,	Lock Haven,	Bell,	J. B. Ryon.
East Keating:					
95 Wm. C. Huff (R),	Westport,	F. H. Dutlinger,	Renovo,	Bell,	F. H. Dutlinger.
355 R. B. Lyman,	Keating via Westport.	N. Y. C. R. R.,		Railroad Phone,	F. H. Dutlinger.
Chas. A. Wadsworth,	Westport,				F. H. Dutlinger.
Flemington Borough:					
Charles Chase,	Flemington,				J. R. Hogentogler.
Gallagher:					
808 Willis Button,	Haneyville,	2912,		United,	R. R. Neefe.
Greene:					
37 Homer S. Metzger (F),	Loganton No. 1,	H. S. Metsger,	Loganton,	Sugar Valley,	Harrisburg.
24 J. R. Hogentogler (F),	Loganton No. 2,	842,	Loganton,	Sugar Valley,	Harrisburg.
196 T. W. Kreamer,	Loganton No. 2,	2,	Loganton,	Commercial,	J. R. Hogentogler.
250 James H. Rockey,	Loganton, R. D.,	813,	Loganton,	Sugar Valley,	J. R. Hogentogler.
Grugan:					
51 James B. Ryon (F),	Glen Union,				Harrisburg.
113 R. K. Merrill (R),	Glen Union,				J. B. Ryon.
Lamar:					
640 G. B. M. Barner,	Salona,	2041,	Mill Hall,	United,	J. R. Hogentogler.
195 J. B. Strunk,	Mill Hall, R. D.,	4531,	Mill Hall,	Nittany,	J. R. Hogentogler.
Leidy:					
42 Max E. Muller (F),	Hammersley Fork,	M. E. Muller,	Germania (Bell),	Dept. of Forestry,	Harrisburg.
206 A. D. Wilson,	Tamarack,				M. E. Muller.
Logan:					
627 R. S. Meyer,	Booneville,		Loganton,	Commercial,	J. R. Hogentogler.
644 W. H. Rishel,	Tylersille,	Alex. S. Greninger,	Loganton,	Sugar Valley,	J. R. Hogentogler.
Noyes:					
16 Forrest H. Dutlinger (F),	Westport,	915-6,	Renovo,	Bell,	Harrisburg.
70 George W. Armstrong (R),	Westport,	915-2,	Renovo,	Bell,	F. H. Dutlinger.
129 Howard P. Seese (R),	Renovo,	915-6,	Renovo,	Bell,	F. H. Dutlinger.
191 Henry E. Kepler,	Renovo,	J. W. Kepler,	Renovo,	Bell,	F. H. Dutlinger.
Pine Creek:					
341 Wm. M. McKinney,	Avis,	1421,	Avis,	Clinton,	R. R. Neefe.
Porter:					
874 W. H. Knarr,	Lamar,	2342,	Mill Hall,	Nittany,	J. R. Hogentogler.
823 W. B. Strunk,	Mill Hall,	4531,	Mill Hall,	Nittany,	J. R. Hogentogler.
South Renovo Borough:					
86 L. O. Weaver,	Renovo,	15-R,	Renovo,	Bell,	F. H. Dutlinger.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

CLINTON COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Wayne:					
98 Adam Kamp (R),	Lockport,	L. Anthony,	Lock Haven,	Commercial,	J. R. Hogentogler.
210 Allen E. McKague,	Youngdale,	908-16,	Lock Haven,	Bell,	J. R. Hogentogler.
205 J. L. O'Donnell,	Pine Station,	908-3,	Avis,	Bell,	J. R. Hogentogler.
	[illegible]	1712,	Lock Haven,	Commercial,	
197 David F. Bixel,	Loganton No. 2,	Elmer Weaver,	Loganton,	Commercial,	J. R. Hogentogler.
West Keating:					
208 D. B. McGonigal,	Pottersdale,				Wm. F. Dague.
635 L. M. Narehood,	Pottersdale,				F. H. Dutlinger.
Woodward:					
123 John T. Rellihan (R),	Lock Haven, R. D.,	163-X,	Lock Haven,	Commercial,	J. B. Ryon.
Peter Stuart,	Lock Haven,				J. B. Ryon.
631 Ward H. Reeder,	Lock Haven,	W. H. Reeder,	Avis,	Commercial,	J. B. Ryon.

COLUMBIA COUNTY.

Beaver:					
W. W. Boone,	Zions Grove,				Harrisburg.
Briar Creek:					
L. B. Knorr,	Berwick No. 2,	W. W. Bauer,	Berwick,	Mt. Springs Cons.,	Harrisburg.
William Lamon,	Berwick No. 2,	8-U,	Berwick,	Consolidated,	Harrisburg.
Centralia Borough:					
E. E. Straub,	Wilburton,				Harrisburg.
Centre:					
Everett Delay,	Berwick No. 3,				Harrisburg.
Fishing Creek:					
W. D. Creasy,	Forks,				Harrisburg.
Amos Wenner,	Stillwater,	55,	Huntingdon,	Peoples (Bell),	Harrisburg.
Greenwood:					
John C. Parker,	Millville,				Harrisburg.
Hemlock:					
George H. Dent,	Bloomsburg No. 1,				Harrisburg.
G. W. Hartman,	Buckhorn,				Harrisburg.
Madison:					
William Eves,	Jerseytown,				Harrisburg.

Mifflin:					
Rush M. Lutz,	Nescopeck,	D. C. Bond,		Consolidated,	Harrisburg.
Sugarloaf:					
B. S. Brush,	Jamison City.				Harrisburg.

CRAWFORD COUNTY

Beaver:					
S. S. McMillen,	Springboro No. 36,				Harrisburg.
Bloomfield:					
J. P. Boutwell,	Centreville No. 2,	16 B,	Riceville,	Peoples Mutual,	Harrisburg.
Cambridge:					
Chas. O. Allen,	Cambridge Springs,	523 W,		Cambridge Electric,	Harrisburg.
Cambridge Springs Borough:					
John F. Himebaugh,	Cambridge Springs,	Mrs. Will Penoyet,		Bell,	Harrisburg.
Centreville Borough:					
Eugene Cook,	Centreville,				Harrisburg.
Cussewago:					
J. A. Webster,	Cambridge Springs,				Harrisburg.
Conneaut Lake Borough:					
W. B. Brown,	Conneaut Lake,				Harrisburg.
Fairfield:					
S. W. Powell,	Cochranton No. 60,	24-13,		Bell,	Harrisburg.
Fallowfield:					
Harry C. Porter,	Hartstown,				Harrisburg.
Hayfield Borough:					
James M. Snyder,	Meadville No. 1,				Harrisburg.
Hydetown Borough:					
J. Frank Witherop,	Hydetown,				Harrisburg.
Linesville Borough:					
A. J. Rushmore,	Linesville,				Harrisburg.
Mead:					
S. D. Minnium,	Meadville,				Harrisburg.
Oil Creek:					
N. W. Reynolds,	Titusville No. 79,				Harrisburg.
Pine:					
Frank Bullis,	Linesville No. 40,	M. Mann-73-3,		Local,	Harrisburg.
Randolph:					
W. A. Powell,	Guys Mills,	12-R-11,	Guys Mills,	Bell,	Harrisburg.
Rockdale:					
Elmer Mathews,	Cambridge Sp. No. 28,	508 U,		Cambridge Electric,	Harrisburg.
Rome:					
E. Lynn Hummer,	Titusville No. 75,				Harrisburg.
Sadsbury:					
Alfred G. Willard,	Conneaut Lake No. 51,				Harrisburg.
Saegertown Borough:					
Clyde N. Rickerson,	Saegertown,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

CRAWFORD COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Sparta:					
Fred L. Bryant,	Spartansburg No. 82,				Harrisburg.
Steuben:					
Reuben Wall,	Tryonville,				Harrisburg.
Summit:					
W. A. Barbour,	Harmonsburg,	W. A. Barbour,		Bell, Meadville Local, or Linesville Local.	Harrisburg.
Troy:					
E. B. Lonctot,	Townville No. 8,	1723 L,	Titusville,	Petroleum,	Harrisburg.
Union:					
John Ernst,	Meadville No. 6,				Harrisburg.
Venango:					
Ray Sherred,	Cambridge Sp. No. 3,	536 N,	Cambridge,	Local,	Harrisburg.
Wayne:					
Seymour Johnson,	Cochranton, R. D.,				Harrisburg.
Woodcock Borough:					
Wallace Harmon,	Woodcock,	516 P,			Harrisburg.

CUMBERLAND COUNTY.

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to.
Cook:					
61 John R. Williams (F),	Pine Grove Furnace,	44-E,	Mount Holly Springs,	C. V.,	Harrisburg.
47 James E. Powers (F),	Pine Grove Furnace,	44-E,	Mount Holly Springs,	C. V.,	J. R. Williams.
864 Oscar Barbour,	Pine Grove Furnace,	44-H,	Mount Holly Springs,	C. V.,	J. R. Williams.
634 Robert I. Brown (R),	Pine Grove Furnace,	R. I. Brown,	Mount Holly Springs,	C. V.,	J. R. Williams.
East Pennsboro:					
R. Frank Shuman,	West Fairview No. 1,				Harrisburg.
Frankford:					
375 Albert Mountz,	Newville, No. 3,	409,	Newville,	United,	H. E. Bryner.
Hampden:					
Jacob W. Waggoner,	Mechanicsburg, R. D.	D. H. Shank, Store,	Mechanicsburg,	C. V.,	Harrisburg.
W. E. Forney,	Mechanicsburg,				Harrisburg.
Lower Mifflin:					
379 Murray D. Stum,	McCrea,				H. E. Bryner.
Wm. V. Dunbar,	Newville No. 2,	McCrea Post Office,			Harrisburg.

Monroe:					
W. C. Shumberger,	Allen,	902-2,	Carlisle,	Bell,	Harrisburg.
North Middleton:					
Wm. H. Lippert,	Carlisle,				Harrisburg.
John E. Brown,	Carlisle No. 2,	Charles Henry,	Carlisle,	Bell,	Harrisburg.
Silver Spring:					
N. W. Albright,	Mechanicsburg, RD.,	7-12,	Mechanicsburg,	United,	Harrisburg.
Southampton:					
333 Solomon Hancock,	Shippensburg,	175-R-12,	Shippensburg,	Bell,	R. G. Conklin.
619 H. S. Mooney,	Shippensburg,	Leonard Baker,	Shippensburg,	Bell,	R. G. Conklin.
South Middleton:					
Ira A. Coulson,	York Springs No. 6,				Harrisburg.
W. F. Donnelly,	Boiling Springs,				Harrisburg.
Upper Mifflin:					
378 E. P. Hassinger,	Newville, No. 4,	81-21,	Newville,	Bell,	H. E. Bryner.
J. A. Brandt,	Newville, R. D.,	74-5,	Newville,	Bell,	Harrisburg.

DAUPHIN COUNTY

Conewago:					
J. S. Farver,	Elizabethtown No. 4,	113-11,	Elizabethtown,	Bell,	Harrisburg.
Dauphin:					
Wm. H. Ege,	Dauphin,				Harrisburg.
Robert Putt,	Dauphin,				Harrisburg.
Derry:					
Christian F. Herr,	Hummelstown No. 1,				Harrisburg.
East Hanover:					
J. F. Hampton,	Grantville,				Harrisburg.
Wm. F. Kline,	Grantville No. 1,				Harrisburg.
Elizabethville Borough:					
Thomas G. Lentz,	Elizabethville,	Milling Co. office,	Elizabethville,	Bell,	Harrisburg.
Gratz Borough:					
F. M. Ritzman,	Gratz,				Harrisburg.
Halifax:					
N. C. Matter,	Halifax No. 1,	C. M. Bowerman's Store, Fisherville.	Halifax,	Bell,	Harrisburg.
Highspire Borough:					
Geo. A. Hoover,	Highspire,				Harrisburg.
Jackson:					
Philip Parmer,	Elizabethville,	Philip Parmer,	Elizabethville,	United,	Harrisburg.
Jefferson:					
John M. Rutter,	Carsonville,	Elsworth Enders,	Elizabethville,	United,	Harrisburg.
Londonderry:					
M. S. Baum,	Middletown,	S. C. Brinser,			Harrisburg.
Lower Swatara:					
Samuel J. Gruber,	Middletown,				Harrisburg.
Lykens:					
Jonathan Smeltz,	Gratz,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

DAUPHIN COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Middletown:					
Frank A. Hill,	Middletown,				Harrisburg.
Middle Paxton:					
Samuel E. Paul,	Piketown No. 1,				Harrisburg.
James Lebo,	Dauphin,				Harrisburg.
Rush:					
Elmer S. Carl,	Tower City No. 1,				Harrisburg.
Susquehanna:					
S. O. Hassler,	Linglestown No. 4,				Harrisburg.
Swatara:					
Chas. E. Livingston,	Oberlin,				Harrisburg.
Uniontown Borough:					
Elmer W. Dockey,	Pillow,	E. W. Dockey,	Mandata,	Bell,	Harrisburg.
Upper Paxton:					
Wm. C. Mills,	Millersburg,	Millersburg Milling or P. R. R. Round House.	Millersburg,	United or Bell,	Harrisburg.
Elmer E. Spotts,	Millersburg No. 2,	Rife Store,	Millersburg,	Bell,	Harrisburg.
David W. Keiter,	Millersburg,	34 K,	Millersburg,	Bell,	Harrisburg.
James M. Martin,	Paxton,				Harrisburg.
Washington:					
Harvey E. Lubold,	Elizabethville No. 1,	Daniel Romberger,	Elizabethville,	Bell,	Harrisburg.
Wayne:					
Jos. H. Romberger,	Halifax No. 1,	Byron Shoop,	Elizabethville,	C. V.,	Harrisburg.
Joseph Miller,	Waynesville,	D. M. Lebo-12-21,	Halifax,	Bell,	Harrisburg.
West Hanover:					
John H. Mumma,	Piketown,	J. H. Mumma,	Shellsville,	East Hanover,	Harrisburg.
West Londonderry:					
John E. Felker,	Middletown No. 1,				Harrisburg.
Williamstown Borough:					
James Williams,	Williamstown,	Lane Reubendall,		Bell,	Harrisburg.
Williams:					
Michael Knorr,	Williamstown,	Jos. Tovey,	Lykens,	C. V.,	Harrisburg.

ELK COUNTY.

	[redacted]				
Benezette:					
65 Charles E. Zerby (F),	Medix Run,	Exchange,	Medix Run,	Bell,	Harrisburg.
77 M. N. U. L. Brooks (R),	Driftwood,	C. E. Zerby,	Medix Run,	Bell,	C. E. Zerby.
488 W. H. Patterson,	Benezette,	Exchange,	Benezette,	Both phones near,	C. E. Zerby.
526 Norman Johnson,	Dents Run,	Norman Johnson,	Benezette,	Bell,	C. E. Zerby.
564 W. B. Johnson,	Benezette, R. D.,	W. B. Johnson,	Benezette,	Bell,	C. E. Zerby.
Benzinger:					
H. O. Wilson,	St. Marys,				C. E. Zerby.
Fox:					
547 John Smithbauer,	Kersey No. 26,	M. B. Spangler,	Kersey,		C. E. Zerby.
Jay:					
487 W. H. Weed,	Weedville,	Exchange,	Weedville,	Weedville,	C. E. Zerby.
522 Norman H. McLeod,	Caledonia,	Exchange,	Weedville,	Bell,	C. E. Zerby.
Johnsonburg Borough:					
549 George B. McClintock,	Johnsonburg,	6122,	Johnsonburg,	Elk,	C. E. Zerby.
		Exchange,	Johnsonburg,	Bell,	C. E. Zerby.
Jones:					
548 George W. Bowley,	Wilcox,	G. W. Bowley,	Wilcox,	Union Commercial,	C. E. Zerby.
Ridgway:					
Samuel Johnson,	Rolfe,				C. E. Zerby.
Ridgway Borough:					
546 Frank McChesney,	Ridgway,				C. E. Zerby.
St. Marys Borough:					
J. J. Erich,	St. Marys,				C. E. Zerby.

FAYETTE COUNTY

Bullskin:					
Amzi McClellan,	Moyer,				Harrisburg.
A. L. Dick,	Stauffer,				Harrisburg.
Connellsville:					
John Jaynes,	S. Connellsville,	978,		Bell,	Harrisburg.
Georges:					
John Shanabarger,	Fairchance,	John Hickle-120-J,		Bell,	Harrisburg.
Henry Clay:					
Jos. H. Humbertson,	Humberston,				Harrisburg.
North Union:					
John C. Beatty,	Uniontown No. 2,	5235-R-3,	Uniontown,	Bell,	Harrisburg.
Saltlick:					
Nicholas L. Sanner,	White,				Harrisburg.
South Union:					
Frank Schnatterly,	Hopwood,				Harrisburg.
Wm. P. Beatty,	Uniontown,	1092-J,		Bell,	Harrisburg.
Stewart:					
E. A. Jackson,	Ohiopyle,				Harrisburg.
Wharton:					
William Chisnell,	Farmington,	5731-R-22,	Uniontown,	Bell,	Harrisburg.
Albert M. West,	Chalk Hill,		Chalk Hill,	Bell,	Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

FOREST COUNTY.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Barnett:					
J. J. Kellogg,	Cooksburg, Box 27,				Harrisburg.
Harmony:					
F. M. Hoovler,	Pleasantville No. 2,				Harrisburg.
Howe:					
Charles Adolfson,	Truemans,				Harrisburg.
Kingsley:					
E. E. Zuendel,	Starr,				Harrisburg.
Tionesta Borough:					
A. W. Stroup,	Tionesta,				Harrisburg.
J. W. Landers,	Tionesta,				Harrisburg.
Tionesta:					
Asa W. Heath,	Tionesta,				Harrisburg.
Adam Mealy,	Tionesta,				Harrisburg.
A. L. Thomson,	Tionesta,				Harrisburg.

FRANKLIN COUNTY

Fannett:					
390 J. Floyd Lytle,	Amberson Valley,	J. F. Lytle,	Dry Run,	Orbisonia,	H. E. Bryner.
559 James F. Wise,	Concord,	J. A. Johns,	Blairs Mills,	Orbisonia,	H. E. Bryner.
J. B. Crouse,	Spring Run,				H. E. Bryner.
Green:					
12 Robert G. Conklin (F),	Fayetteville No. 2,	11-X,	Fayetteville,	C. V.,	Harrisburg.
120 Harry B. Perry (R),	Fayetteville No. 2,	R. G. Conklin,	Fayetteville,	C. V.,	R. G. Conklin.
136 Henry L. Stull (R),	Black Gap,	H. L. Stull,	Fayetteville,	C. V.,	R. G. Conklin.
279 W. L. Eckenrode,	Fayetteville, R. D.,	R. M. Renfrew,	Chambersburg,	Bell,	R. G. Conklin.
Guilford:					
131 John S. Shaffer (R),	Chambersburg No. 11,	2-K,	Waynesboro,	C. V.,	L. E. Staley.
Letterkenny:					
130 J. Frank Smith (R),	Chambersburg No. 4,	750-B,	Chambersburg,	United,	A. E. Rupp.
822 John H. Horne,	Freestone,		St. Thomas,	C. V.,	A. E. Rupp.
274 E. S. Newton,	Upper Strasburg,	D. H. Byers,	Chambersburg,	C. V.,	A. E. Rupp.

Lurgan:					
223 D. L. Sentman,	Roxbury,	Shields Store,	Shippensburg,	C. V.,	A. E. Rupp.
595 E. Z. Jones,	Mowersville,	Robert Davis,	Newburg,	C. V.,	A. E. Rupp.
Metal:					
283 Alvin J. Horning,	Metal,	A. J. Horning,	St. Thomas,	Orbisonia,	A. E. Rupp.
221 Henry Stains,	Richmond Furnace,			C. V.,	A. E. Rupp.
222 Robert F. Kent,	Fannettsburg,	F. C. Worthington,			A. E. Rupp.
Montgomery:					
397 James Carbaugh,	Mercersburg,		Mercersburg,	Bell,	A. E. Rupp.
287 Benj. F. Shives,	Mercersburg,	60-R-12,	Mercersburg,	Western Electric,	A. E. Rupp.
230 James V. Hornbaker,	Mercersburg No. 3,	365,	Mercersburg,	Bell,	A. E. Rupp.
Peters:					
50 Alfred E. Rupp (F),	Fort Loudon,	4-G, 79-4,	St. Thomas, Mercersburg,	United, Bell.	Harrisburg.
218 Millard Kline,	Fort Loudon,	A. E. Rapp,	Mercersburg,		A. E. Rupp.
219 Harry Ensminger,	Folts,	Ritzels Store,	Mercersburg,	Bell,	A. E. Rupp.
Quincy:					
56 Lewis Staley (F),	Mont Alto,	9-Y, Forest Academy,	Fayetteville Waynesboro,	C. V., Bell.	Harrisburg.
66 E. A. Ziegler (F),	Mont Alto,	Forest Academy,		Both phones,	L. E. Staley.
28 J. S. Illick (F),	Mont Alto,	Forest Academy,		Both phones,	L. E. Staley.
48 G. A. Retan (F),	Mont Alto,	Forest Academy,		Both phones,	L. E. Staley.
76 John Bricker (R),	Waynesboro,	L. E. Staley,	Fayetteville,	C. V.,	L. E. Staley.
J. T. Staley,	Fayetteville, RD.,				L. E. Staley.
Southampton:					
278 W. E. Perry,	Fayetteville No. 1,	Wm. H. Smith,			R. G. Conklin.
St. Thomas:					
217 John Foreman,	Edenville,	John Foreman,	Chambersburg and St. Thomas.	United,	A. E. Rupp.
824 John E. Spidel,	St. Thomas,	Chas. Dixon,	St. Thomas,	C. V.,	A. E. Rupp.
Warren:					
216 Luther A. Zimmerman,	Sylvan,	Albert Zimmerman,	Mercersburg,	Bell,	A. E. Rupp.
811 Jacob Pine,	Sylvan,	4381,	Mercersburg,	Bell,	A. E. Rupp.
Washington:					
140 H. L. Thomas (R),	Waynesboro No. 4,	906-R-12,	Waynesboro,	Bell,	L. E. Staley.

FULTON COUNTY.

Ayr:					
765 D. L. Alexander,	McConnellsburg,	J. S. Alexander,		Bell,	A. E. Rupp.
809 Charles B. Taylor,	McConnellsburg,	Wm. Brewer,		Bell,	A. E. Rupp.
810 Harvey J. Unger,	Cito,	22-R-5,	McConnellsburg,	Bell,	A. E. Rupp.
Belfast:					
821 J. Frank Hess,	Warfordsburg No. 1,	5,		Bell,	A. E. Rupp.
686 Milton Melliott,	Needmore No. 2,	3-R-31,	Breezewood or McConnellsburg.	Bell,	A. E. Rupp.
112 B. A. Truax,	Needmore No. 2,	W. R. Truax,	McConnellsburg,	Bell,	A. E. Rupp.
Bethel:					
747 Alfred F. Schetrompf,	Warfordsburg,				A. E. Rupp.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

FULTON COUNTY—Continued.

Township, Number, Name.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Brush Creek:					
685 Edgar A. Diehl,	Locust Grove,	2-4,	McConnellsburg,	McC. & B.,	A. E. Rupp.
662 M. J. Hixson,	Crystal Spring,				A. E. Rupp.
746 H. M. Jackson,	Akersville,	H. M. Jackson,	Everett,	Bedford-Fulton,	A. E. Rupp.
772 Anthony Spade,	Emmaville,	John Kregars,		Bell,	A. E. Rupp.
697 W. H. Williams,	Akersville,	W. H. Williams, 34-5,	Breezewood, [illegible]	McC. & B.,	A. E. Rupp.
Licking Creek:					
214 Robert R. Hann,	Saluvia,	Saluvia P. O.,		Both Phones,	A. E. Rupp.
708 Edward V. Mellott,	Needmore No. 1,				A. E. Rupp.
Dublin:					
392 Elmer E. Fraker,	Fort Littleton,			Both Phones,	A. E. Rupp.
393 James E. Shore,	Burnt Cabins,	Burnt Cabins,		Both Phones,	A. E. Rupp.
Taylor:					
257 J. V. Deaver,	Laidig,	J. V. Deaver,	McConnellsburg,	Peoples (Bell),	A. E. Rupp.
215 S. S. Strait,	Waterfall,	S. S. Strait,	New Grenada,	Mutual,	A. E. Rupp.
706 Wm. G. Bergstresser,	Waterfall,	Wm. Bergstresser,	New Grenada,	Mutual,	A. E. Rupp.
Thompson:					
213 Fulton Gordon,	Dickeys Mountain,	Big Cove Tannery,		Bell,	A. E. Rupp.
285 A. B. Gordon,	Plum Run,	[illegible]	Hancock, Md.,	Bell,	A. E. Rupp.
Todd:					
81 J. V. Carlin (R),	Metal,	A. E. Rupp,	St. Thomas, Mercersburg,	United, Bell.	A. E. Rupp.
698 Leslie Harr,	McConnellsburg,	D. F. Trouts,	McConnellsburg,	Bell,	A. E. Rupp.
806 Enoch Kerlin,	Knobsville,	John Shear,	Fannettsburg,	N. G. & McC.,	A. E. Rupp.
Union:					
212 Buhrman Stahle,	Buck Valley,	B. Stahle,	Buck Valley,	Bell,	A. E. Rupp.
661 Wm. H. Carnell,	Amaranth,				A. E. Rupp.
Wells:					
334 H. H. Bridenstine,	Enid,	Hunter R. Truax,			A. E. Rupp.
211 A. H. Stevens,	Enid,	A. H. Stevens,		Wells Valley,	A. E. Rupp.
647 Albert Heisel,	Wells Tannery,				A. E. Rupp.
648 A. D. Keith,	New Grenada,				A. E. Rupp.

HUNTINGDON COUNTY.

Barree:					
90 W. H. Harpster (R),	Charter Oak,	W. H. Harpster,	Petersburg,	N. S. C. Mutual,	J. W. Keller.
		Vernon L. Porter,		Bell.	
428 John W. McAlevy,	Neffs Mills,	J. W. McAlevy,	Petersburg,	N. W. Mutual,	T. R. Morton.
Brady:					
424 W. P. Metz,	Airydale,	W. P. Metz,	Bell Transfer,	Allensville & Mill creek.	A. W. Bodine.
Broad Top City,					
516 A. J. Black,	Broad Top,	A. J. Black,		Bell,	Harrisburg.
Carbon:					
603 Alen Donelson,	Coalmont,	19-R-21,	Coalmont,		Harrisburg.
Cass:					
543 William Black,	Calvin,				Harrisburg.
421 George D. Lynn,	Mapleton Dep. No. 1,	L. R. Bowman,	Saltillo,		A. W. Bodine.
Clay:					
866 W. S. Hicks,	Three Springs,	W. S. Hicks,	Saltillo or Three Springs.	Saltillo,	A. W. Bodine.
594 Paul Rupert,	Saltillo,	7-R-2,	Saltillo,	Saltillo,	Harrisburg.
Cromwell:					
418 John M. Hileman,	Three Springs,	D. L. Whitsel,			A. W. Bodine.
Dublin:					
725 Oliver Diven,	Shade Gap,	Oliver Diven,	Orbisonia,	Orbisonia,	A. W. Bodine.
829 M. C. Free,	Decorum,				A. E. Rupp.
417 S. D. Peterson,	Neelyton,		Neelytown,	Orbisonia,	A. W. Bodine.
Franklin:					
84 G. C. Deter (R),	Graysville,	Bathurst's Store,	Warriors Mark,		T. R. Morton.
532 Samuel Alley,	Franklinville,	Miss M. Steward,		Hunt. & Centre,	T. R. Morton.
500 James C. Miller,	Franklinville,	876,	Warriors Mark,	Hunt. & Centre,	T. R. Morton.
Henderson:					
431 George W. Hetrick,	Huntingdon No. 3,	907-R-14,	Huntingdon,	Stone Valley,	T. R. Morton.
555 H. F. Westover,	Huntingdon,				T. R. Morton.
Hopewell:					
514 Leonard W. Treece,	Shy Beaver,	G. W. Ward, Store,	Woodcock Valley,		Harrisburg.
515 B. F. Treece,	Shy Beaver,	B. F. Treece,	Marklesburg,	Bell,	Harrisburg.
Jackson:					
7 Tom O. Bietsch (F),	McAlevysfort,	910-1,	Lewistown,	Bell,	Harrisburg.
127 G. E. Ross (R),	McAlevysfort,	910-1,	Lewistown,	Bell,	T. O. Bietsch.
202 Daniel Benson (R),	McAlevysfort,				T. O. Bietsch.
297 Willis E. Henry,	McAlevysfort,	Exchange,	McAlevysfort,	Bell,	T. O. Bietsch.
429 George W. Frew,	McAlevysfort,				T. O. Bietsch.
534 Lee D. Wilson,	McAlevysfort,	Mrs. O. M. Whipple,	Petersburg,		J. W. Keller.
Juniata:					
518 Joseph W. Yocum,	Huntingdon,	915-R-12,	Huntingdon,	Juniata Union,	Harrisburg.
Lincoln:					
530 Albert Criswell,	Entriken,	A. Criswell,	Marklesburg,	Woodcock Valley,	Harrisburg.
536 R. R. Maloney,	Entriken,	Entriken P. O.,	Huntingdon,	Bell,	Harrisburg.
Logan:					
39 T. Roy Morton (F),	Petersburg,	T. Roy Morton,	Petersburg,	J. & S. C.,	Harrisburg.
436 Elmer W. Stryker,	Petersburg, RD.,	J. H. Scott,	Petersburg,	J. & S. C.,	T. R. Morton.
426 Frank Hawn,	Petersburg,				T. R. Morton.
Mill Creek Borough:					
423 Edward H. Green,	Mill Creek,	913-R-2,	Huntingdon,	Bell,	A. W. Bodine.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

HUNTINGDON COUNTY—Continued.

Township, Name, Number.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Miller:					
75 Howard J. Boop (R),	Huntingdon,	C. M. Smith,	Huntingdon,		T. O. Beitsch.
511 L. Brown Harman,	Huntingdon No. 2,	902-R-23,	Huntingdon,	Stone Valley,	T. R. Morton.
Morris:					
John J. Kemmler,	Waterstreet,				T. R. Morton.
Mount Union Borough:					
422 O. J. Cassady,	Mount Union,	39,		Bell,	A. W. Bodine.
Oneida:					
477 W. P. Musser,	Huntingdon No. 2,	H. H. Oswald,			T. R. Morton.
Penn:					
519 Robert A. Norris,	Grafton,	R. A. Norris,	Grafton,	Baystown,	Harrisburg.
585 Harry B. Moyer,	Grafton,	R. A. Porter,		Bell,	Harrisburg.
Porter:					
707 R. V. Sharp,	Barree,		Alexandria,	Bell,	T. R. Morton.
430 E. J. Green,	Alexandria,	911-R-12,	Huntingdon,	Warriors Ridge,	T. R. Morton.
Shirley:					
8 Alfred W. Bodine (F),	Mount Union No. 1,	A. W. Bodine,	Mount Union,	Orbisonia,	Harrisburg.
499 Samuel J. Erwin,	Valley Point,				A. W. Bodine.
420 H. S. Myers,	Shirleysburg,	W. H. Crone,		Bell,	A. W. Bodine.
538 Clayton Hamman,	Mount Union,	John Shuer,		Saltillo,	A. W. Bodine.
616 J. Taylor McGee,	Mount Union,	1-R-4,	Mount Union,	Bell,	A. W. Bodine.
Springfield:					
561 C. P. Greene,	Orbisonia, RD.,				A. W. Bodine.
Spruce Creek:					
579 Frank Mallory,	Spruce Creek,	Schultz's Store,	Spruce Creek,	Bell,	T. R. Morton.
Tell:					
416 H. A. Wiser,	Blairs Mills, RD.,	H. A. Wiser,	Behels & Jeffries,	Orbisonia,	A. W. Bodine.
425 Harry H. Burdge,	Shade Valley,	H. H. Burdge,	Behel,	Orbisonia,	A. W. Bodine.
Three Springs Borough:					
419 E. S. Heeter,	Three Springs,	Public phone at Three Springs.			A. W. Bodine.
Todd:					
517 Amon Saylor,	Todd,	E. N. McNerlins,	Cassville,	Bell,	Harrisburg.
556 J. D. Scott,	Trough Creek,		Newburg,	Bell & Saltillo,	Harrisburg.
Union:					
807 W. R. Crotsley,	Colfax,	W. A. Crotsley,	Huntingdon,	Bell,	A. W. Bodine.
513 W. W. Wright,	Mill Creek,	915-R-13,	Huntingdon,	Juniata Union,	Harrisburg.
415 Lloyd Parker,	Mapleton Depot,	15-R-5,	Mount Union,	Bell,	A. W. Bodine.
Walker:					
33 George M. Robb,	Alexandria No. 1,	G. M. Robb,	Marklesburg,	Woodcock,	Harrisburg.

Warriors Mark:					
615 C. A. Geist,	Warriors Mark,	3-12,	Warriors Mark,	Hunt. & Centre,	T. R. Morton.
868 H. F. Harpster,	Warroirs Mark No. 2,	16-17,	Warriors Mark,	Bell,	T. R. Morton.
West:					
106 S. H. Lightner (R),	Cottage,	Croyle's Store,	Petersburg,		T. R. Morton.
427 G. W. Parsons,	Neffs Mills,	S. E. Croyle,	Petersburg,		T. R. Morton.

INDIANA COUNTY.

Armagh Borough:					
H. L. Tinkcom,	Armagh,				Harrisburg.
Brushvalley:					
T. W. Altemus,	Brushvalley,	Exchange,	Brushvalley,	Bell,	Harrisburg.
Buffington:					
John M. Barkley,	Dilltown,				Harrisburg.
Burrell:					
Albert Ferguson,	Blairsville No. 1.				Harrisburg.
Canoe:					
Cliff McFarland,	Rossiter No. 1,				Harrisburg.
Cherryhill:					
R. E. Simpson,	Penn Run,				Harrisburg.
Conemaugh:					
J. P. Kier,	Clarksburg,				Harrisburg.
Creekside Borough:					
M. L. Carnahan,	Creekside,				Harrisburg.
East Wheatfield:					
H. W. Griffith,	Cramer,	H. W. Griffith,	Seward,		Harrisburg.
Glen Campbell Borough:					
H. Barkey,	Glen Campbell,				Harrisburg.
Grant:					
Geo. H. Jeffries,	Rochester Mills,				Harrisburg.
Green:					
J. B. Reed,	Love Joy,	J. B. Reed,	Clymer or Indiana,	Farmers' Line,	Harrisburg.
D. P. McDannell,	Cherrytree No. 2,	Asaph McNulty,	Cherrytree,	Farmers' Line,	Harrisburg.
Homer City Borough:					
E. B. Griffith,	Homer City,				Harrisburg.
Mahoning (East):					
J. H. North,	Marion Center,	J. H. North,	Bell,	Farmers' Tel. Co.,	Harrisburg.
Montgomery:					
John E. Ruffner,	Arcadia,				Harrisburg.
Rayne:					
W. H. Buchanan,	Home, No. 2,	W. H. Buchanan,	Indiana,	Hunt. & Clearfield,	Harrisburg.
Saltsburg Borough:					
Robert J. Irvin,	Saltsburg,				Harrisburg.
South Mahoning:					
N. Seanor,	Plumville,	Home and Office,	Bell,	Farmers',	Harrisburg.
West Wheatfield:					
Thomas Gamble,	Robinson,	John H. Bowser,	Bolivar,	Bell,	Harrisburg.
A. P. Clark,	Blacklick, No. 1,				Harrisburg.
Young:					
H. B. Fulton,	West Lebanon,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

JEFFERSON COUNTY

Township, Name, Number.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Barnett:					
John Cook,	Cooksburg,	John Cook,		Redbank,	Harrisburg.
Eldred:					
J. B. Park,	Sigel,				Harrisburg.
Gaskill:					
R. N. Calhoun,	Big Run, No. 2,				Harrisburg.
Heath:					
James Silvis,	Sigel No. 1,	James Silvis,		Redbank,	Harrisburg.
McCalmont:					
W. D. Wachob,	Punxsutawney, No. 1,	W. D. Wachob,	Summerville,	Farmers',	Harrisburg.
Oliver:					
M. I. Kunselman,	Coolspring,				Harrisburg.
Washington:					
Wm. McDonald,	Falls Creek, No. 1,				Harrisburg.
Winslow:					
Wm. T. Cox,	Sandy Valley,	W. T. Cox,	Reynoldsville,	Summerville,	Harrisburg.

JUNIATA COUNTY

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to
Beale:					
761 H. A. Brittain,	Mifflin,				A. W. Bodine.
Fayette:					
Benj. F. Trego,	McAllisterville No. 1,				D. K. Warfield.
Fermanagh:					
659 C. C. Shellenberger,	Mifflintown,	C. C. Shellenberger,	Mifflintown,	Lost Creek,	D. K. Warfield.
D. C. Suloff,	Mifflintown,				D. K. Warfield.
Greenwood:					
790 John L. Gelnett,	Millerstown,	8,	Millerstown,	Bell,	D. K. Warfield.
I. R. Bostwick,	Millertown, No. 3,	Seven Stars,	Millerstown,	Bell,	D. K. Warfield.
Lack:					
636 Robert Hamman,	Blacklog,	Blacklog Post Office,		Bell,	A. W. Bodine.
900 Chester D. Hammond,	Blacklog,				A. W. Bodine.
119 H. A. Oppel (R),	Blacklog,				A. W. Bodine.
440 Carl E. Book,	Blacklog,	C. E. Cook,	Mifflintown,	Bell or United,	A. W. Bodine.
439 Charles Lauthers,	Perulack,	Chas. Lauthers,	Blairs Mills,	Orbisonia,	A. W. Bodine.

Mifflintown Borough:					
L. B. Hawk,	Mifflintown,				D. K. Warfield.
Milford:					
437 C. M. McCahan,	Mifflin,	C. M. McCahan,	Mifflin & Port Royal,	United,	A. W. Bodine.
469 J. H. Wetzler,	Mifflin, No. 1,	J. H. Wetzler,	Mifflintown,	United,	A. W. Bodine.
Monroe:					
Lewis Womer,	Richfield,				D. K. Warfield.
Patterson Borough:					
A. L. Eshelman,	Mifflin,				A. W. Bodine.
Spruce Hill:					
797 John Gilliford,	Spruce Hill,	J. Gilliford,	Port Royal,	Orbisonia,	A. W. Bodine.
Susquehanna:					
H. C. Klinger,	Liverpool, No. 1,	H. C. Klinger,	Liverpool,	United,	D. K. Warfield.
Tuscarora:					
438 C. M. McMeen,	East Waterford No. 2,	C. M. McMeen,	Mifflintown,	Bell,	A. W. Bodine.
Walker:					
B. F. Caveny,	Mexico,				D. K. Warfield.

LACKAWANNA COUNTY.

Archbald Borough:					
P. F. Gallagher,	Archbald,	111 R.,		Consolidated,	Harrisburg.
Benton:					
E. J. Wiedman,	Factoryville, No. 2,	John Rink,	Factoryville,		Harrisburg.
John M. Nafus,	Fleetville,	Fleetville Hotel,		Bell,	Harrisburg.
Albert L. Stanton,	Factoryville, No. 2,	738,	Factoryville,	Bell,	Harrisburg.
Clifton:					
666 Louis E. Kessler,	Gouldsboro,	Exchange,	Gouldsboro,		J. L. Strobeck.
664 David Smith,	Thornhurst,	15,	Gouldsboro,	Bell,	J. L. Strobeck.
Covington:					
Freeman Larnerd,	Moscow, No. 3,	W. M. Wagner, 4-6,		Bell,	Harrisburg.
Dunmore Borough:					
Edward E. Earley,	123 Bloom St., Dunmore.				Harrisburg.
Greenfield:					
J. F. Kenyon,	Carbondale,				Harrisburg.
Jefferson:					
John P. Moore,	Wimmers, No. 1,	2 G,	Hamlin,	Paupack,	Harrisburg.
Laplume Borough:					
Earl Seamans,	Factoryville,				Harrisburg.
Lehigh:					
99 Dr. W. L. Kauffman (R),	Thornhurst,				J. L. Strobeck.
665 Ammi L. Learn,	Thornhurst,	Larning Harvey,		Bell,	J. L. Strobeck.
569 Charles A. Hessler,	Thornhurst,	6-6,	Wilkes-Barre,	Bell,	J. L. Strobeck.
Madison:					
Charles W. Noack,	Moscow,	Telegraph Office,	Moscow,		Harrisburg.
Newton:					
J. L. Drake,	Baldmount,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

LACKAWANNA COUNTY—Continued.

Township, Name, Number.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
North Abington:					
W. B. Aylsworth,	Dalton, No. 3,				Harrisburg.
Ransom:					
Hervey J. Beagle,	Taylor, R. D.,	Francis R. Coyne,			Harrisburg.
Roaring Brook:					
Conrad Riehl,	Elmhurst,				Harrisburg.
South Abington:					
Wm. C. Hall,	Chinchilla,				Harrisburg.
Spring Brook:					
663 J. W. Haines,	Moscow No. 3,	6-R-25,	Moscow,	Rural,	J. L. Strobeck.
West Abington:					
Elmer J. Peet,	Dalton, No. 2,				Harrisburg.

LANCASTER COUNTY

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to
Bart:					
B. H. Drancker,	Bart,	Bart Post Office,		Bell,	Harrisburg.
Caernarvon:					
Israel Clark,	Churchtown,				Harrisburg.
Colerain:					
William Jack,	Colerain,				Harrisburg.
Conestoga:					
Wm. A. Wade,	Conestoga,				Harrisburg.
Drumore:					
J. Ed. Brown,	Chestnut Level,	402,	Hensel,	Bell,	Harrisburg.
Earl:					
J. H. Greenberger,	New Holland,	731 C,	New Holland,	Enterprise,	Harrisburg.
East Earl:					
E. S. Geist,	Blue Ball,				Harrisburg.
Eden:					
Joseph H. Wimer,	Quarryville, No. 1,	374,	Quarryville,	Bell,	Harrisburg.
Elizabeth:					
Charles G. Enck,	Brickerville,	75-2, 30 L,	Lititz, Lititz,	Bell, Independent,	Harrisburg. Harrisburg.

Manheim: Geo. D. Landis,	Landis Valley,	1913 J,	Lancaster,	United,	Harrisburg.
Martic: Edward Eshleman,	Marticville,				Harrisburg.
Mount Joy: W. B. Hamilton,	Elizabethtown, No. 2,				Harrisburg.
Paradise: John L. Miller,	Paradise,				Harrisburg.
Penn: John H. Boyer,	Mount Hope,				Harrisburg.
Pequea: S. M. Mylin,	Willow Street, No. 1,	1913 H,	Lancaster,	United,	Harrisburg.
Providence: Henry Martin,	Smithville,	O. E. Martin,	Smithville,	United,	Harrisburg.
Rapho: W. H. Strickler,	Mount Joy,				Harrisburg.
Salisbury: Park J. Bair,	Salisbury,	820 Q,	New Holland,	Enterprise,	Harrisburg.
West Cocalico: J. R. Shirk,	Schoeneck,				Harrisburg.
West Donegal: Jacob S. Doveler,	Elizabethtown, No. 1,	H. B. Keller, 117-11,	Elizabethtown,	Bell,	Harrisburg.
West Earl: B. S. Rupp,	Talmage,				Harrisburg.
West Hempfield: C. G. Garber,	Mountville,				Harrisburg.

LAWRENCE COUNTY.

Big Beaver: Stephen Brown,	New Galilee, No. 3,				Harrisburg.
Neshannock: Orien C. Stimple,	New Castle, No. 5,				Harrisburg.
Plaingrove: John Montgomery,	Volant, R. D.,				Harrisburg.
Pulaski: John H. Foreman,	Pulaski,				Harrisburg.
Shenango: T. T. Kennedy,	New Castle, No. 7,				Harrisburg.
Taylor: John R. Wright,	New Castle, No. 7,	991-3,		Bell,	Harrisburg.
Wilmington: W. M. Boyd,	Volant, No. 3,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued

LEBANON COUNTY.

Township, Name, Number.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Bethel:					
Jacob E. Beheny,	Fredericksburg,				Harrisburg.
Cornwall:					
William Nelson,	Cornwall,	Cornwall Ore Bank,	Lebanon,	Both Phones,	Harrisburg.
Heidelberg:					
I. Horst,	Shaefferstown,				Harrisburg.
Jackson:					
Andrew H. Spannuth,	Myerstown, No. 1,				Harrisburg.
North Cornwall:					
Jacob S. Kreider,	Lebanon, No. 4,				Harrisburg.
Swatara:					
Levi S. Moyer,	Jonestown, No. 1,	298,	Frystown,	Bethel & Mt. Aetna,	Harrisburg.
Union:					
Henry L. Felty,	Suedberg,	Elmer Fake, 19-R-2,	Lebanon,	Bell,	Harrisburg.
Henry Kreiser,	Onset, No. 1,				Harrisburg.
Morris Kohr,	Onset,				Harrisburg.
Cyrus B. Felty,	Suedberg,				Harrisburg.
West Cornwall:					
Fred McMann,	Bismarck,	83-R-13,	Lebanon,	Bell,	Harrisburg.
West Lebanon:					
Thomas H. Clark,	Lebanon,				Harrisburg.

LEHIGH COUNTY.

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to
Catasauqua Borough:					
George W. Young,	Catasauqua,	Edgar Bros. Restaurant,			Harrisburg.
Coopersburg Borough:					
C. H. Jordan,	Coopersburg,				Harrisburg.
Russell Kern,	Coopersburg,				Harrisburg.
Fountain Hill Borough:					
Harry W. Wachter,	South Bethlehem,				Harrisburg.
Heidelberg:					
Samuel J. Heffintrayer,	Saegersville,				Harrisburg.

Lower Milford:					
Ellwood F. Dietz,	Coopersburg, No. 2,				Harrisburg.
Amanders Y. Schute,	Zionsville, No. 1,				Harrisburg.
Lowhill:					
Wm. F. Frey,	New Tripoli, No. 2,	24-4,		Lehigh or Consolidated,	Harrisburg.
Lynn:					
Geo. H. Rabert,	New Tripoli,	5-G,	Tripoli,	Consolidated,	Harrisburg.
North Whitehall:					
B. J. Schlosser,	Schnecksville,				Harrisburg.
Salisbury:					
844 R. G. Ludwig,	Allentown,	870,	Allentown,	Bell,	J. E. McNeal.
Bernard Scharles,	Allentown,	Frank Wagner,	Allentown,		Harrisburg.
South Whitehall:					
Alfred J. Sittler,	Allentown, No. 6,				Harrisburg.
Upper Mauncgie:					
H. C. Gernert,	Breinigsville,				Harrisburg.
S. F. Gehringer,	Fogelsville,				Harrisburg.
Upper Milford:					
Henry B. Geissinger,	Zionsville,				Harrisburg.
Upper Saucon:					
Joseph J. Mory,	South Bethlehem No. 1.				Harrisburg.
Frank Wagner,	Allentown, No. 2,				Harrisburg.
Washington:					
John Dorward,	Slatedale,	Shentons Store or E. Gross Bakery.	Slatington,	Lehigh,	Harrisburg.
Weisenberg:					
C. H. Kramlich,	Breinigsville, No. 2,	Kutztown,	New Smithville,		Harrisburg.
Whitehall :					
James Leiby,	Stiles,				Harrisburg.

LUZERNE COUNTY.

Bear Creek:					
A. F. Bond,	Bear Creek,	10-4, 10-5, or 10-3,		Bell,	Harrisburg.
Black Creek:					
L. W. Crouse,	Mountain Grove,				Harrisburg.
Buck:					
William Dutter,	Thornhurst,				J. L. Strobeck.
Edward R. Stull,	Stoddartsville,				Harrisburg.
Denison:					
604 Sylvester Amend,	White Haven,	Ice Lake Hotel,	White Haven,		J. L. Strobeck.
G. L. Barry,	White Haven,				Harrisburg.
Dorrance:					
Conrad Stein,	Wapwallopen, No. 3,	John Stein or Jacob Stein,	Wapwallopen,	Bell,	Harrisburg.
Elmer E. Eckrote,	Wapwallopen, No. 2,	John Heller, 117,	Wapwallopen,		Harrisburg.
John Kanaske, Jr.,	Mountaintop, No. 1,				Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

LUZERNE COUNTY—Continued.

Township, Name, Number.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Duryea Borough:					
Harry Frost,	Duryea,				Harrisburg.
Fairmount:					
Walter Blaine,	Broadway, No. 1,	3616,	Huntingdon Mills,	Bell,	Harrisburg.
Chas. W. Dohl,	Broadway, R. D.,	3-162,	Huntingdon Mills,	Bell,	Harrisburg.
Fairview:					
Richard I. Conety,	Glen Summit Springs,	18-3,	Glen Summit Springs,	Bell,	Harrisburg.
Foster:					
James Brislin,	Upper Lehigh,				Harrisburg.
Franklin:					
Arthur Lewis,	Wyoming, No. 3,	112-14,	Dallas,	Commonwealth,	Harrisburg.
Freeland Borough:					
O. D. Fowler,	Drifton,				Harrisburg.
Hazle:					
William Wolfe,	682 Alter St., Hazleton.	Locust St. School,		Consolidated,	Harrisburg.
Jackson:					
C. W. Ehret,	Trucksville, No. 1,	102-17,	Dallas,	Commonwealth,	Harrisburg.
Lake:					
F. A. Kocher,	Alderson, No. 1,	R. P. Kocher,	Dallas,	Bell,	Harrisburg.
Laurel Run Borough:					
Geo. W. Bower,	976 E. Northampton St., Wilkes-Barre,	T. B. Harris,	Wilkes-Barre,	Bell,	Harrisburg.
Lehman:					
Hiram Craft,	Lehman,	170-4 (Store at Lehman).	Dallas,	Bell,	Harrisburg.
Luzerne Borough:					
Edwin W. Abbott,	Luzerne (20 Main St.)	Payne & Perrin,	Luzerne,		Harrisburg.
Nuangola Borough:					
Foster Storm,	Nuangola,	119-3,	Wapwallopen,	Bell,	Harrisburg.
Plymouth:					
Alfred Warman,	Plymouth,				Harrisburg.
Salem:					
Geo. B. Robbins,	Shickshinny,	21-61,	Shickshinny,	Farmers',	Harrisburg.
Sugarloaf:					
Angelo Lucki,	Conyngham, R. D.,		Hazleton,	Both Phones,	Harrisburg.
Freas E. Klinger,	Sugarloaf, No. 1,				Harrisburg.
Union:					
D. J. Sorber,	Shickshinny, No. 1,	Roy Martin,	Shickshinny,		Harrisburg.
Joseph E. Belles,	Shickshinny, No. 1,	R. J. Martin,	Shickshinny,		Harrisburg.

West Hazleton Borough:					
Elmer E. Airey,	Hazleton,				Harrisburg.
White Haven Borough:					
Charles E. Waller,	White Haven,				Harrisburg.
Wright:					
Herbert Williams,	Glen Summit Springs,				Harrisburg.

LYCOMING COUNTY.

Armstrong:					
Albert P. Decker,	DuBoistown, R. D.,	28-Z,		United,	C. E. Baer.
Brady:					
108 Joseph Manley (R),	Montgomery, No. 2,	J. Manley,	Maple Hill,	United (White Deer),	C. E. Baer.
Brown:					
40 Howard H. Morgan,	Slate Run,	H. H. Morgan,	Germania (Bell),	State Line,	Harrisburg.
143 C. D. Will (R),	Slate Run,	H. H. Morgan,	Germania (Bell),	State Line,	H. H. Morgan.
150 Frank Chandlee (R),	Slate Run,	H. H. Morgan,	Germania (Bell),	State Line,	H. H. Morgan.
339 Benj. T. Gamble,	Cedar Run,	Cedar Run,	Germania (Bell),	State Line,	T. C. Harbeson.
340 Theo. H. Hoffman,	Cedar Run,	Cedar Run,	Germania (Bell),	State Line,	T. C. Harbeson.
798 Sylvester G. Tome,	Slate Run,	B. T. Wolfe,	Germania (Bell),	State Line,	R. R. Neefe.
Cascade:					
319 Willard Moyer,	Bodines,	W. Moyer,	Trout Run,	Ralston,	A. B. Wells.
Cogan House:					
363 Ralph W. Hopkins,	Brookside,	Lewis Faivre,	Brookside,	Bell,	R. M. Neefe.
Cummings:					
45 Robert R. Neefe (F),	Waterville,	R. R. Neefe,	Brookside,	Bell,	Harrisburg.
Eldred:					
121 George H. Pidcoe (R),	Williamsport, No. 1,	R-23-L,	Williamsport,	Loyalsock,	J. A. Bastian.
366 Peter W. Kline,	Hepburnville, No. 1,	9-R-4,	Warrenville,	Blooming Grove (Bell)	J. A. Bastian.
Joseph Weinman,	Hepburnville,				J. A. Bastian.
Fairfield:					
370 Clyde C. Persun,	Montoursville,	23-G,	Montoursville,	United,	J. A. Bastian.
371 James Keebler,	Montoursville,	59-P,	Montoursville,	Loyalsock,	J. A. Bastian.
369 Harry P. Keyte,	Montoursville,	3-L,	Montoursville,	Loyalsock,	J. A. Bastian.
Franklin:					
898 J. D. Lunger,	Lairdsville,	L. Budman,			J. A. Bastian.
Gamble:					
365 William Finicle,	Loyalsock,	39-R,	Montoursville,	United,	J. A. Bastian.
318 J. T. Eddy,	Trout Run,	5-A-4,	Warrensville,	Bell,	A. B. Wells.
317 John W. Ely,	Calvert,	5-R-32,	Warrensville,	Bell,	A. B. Wells.
Hepburn:					
Clarence Losch,	Cogan Station,				A. B. Wells.
Jackson:					
W. D. Mitstifer,	Buttonwood,				R. R. Neefe.
Jordan:					
397 Thomas Fiester,	Unityville,	J. E. Whitmier,	Unityville,	Bell,	J. A. Bastian.
Lewis:					
60 Arthur B. Wells (F)	Fields Station,	Elisha Strouble,	Trout Run,	Ralston,	Harrisburg.
350 Willard W. Weis,	Trout Run,	W. W. Weis,	Trout Run,	Ralston,	A. B. Wells.
332 L. T. Newman,	Fields Station,	Elisha Strouble,	Trout Run,	Ralston,	A. B. Wells.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

LYCOMING COUNTY—Continued.

Township, Name, Number.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Limestone:					
321 M. O. Welshans,	Jersey Shore, No. 4,	2081,	Oriole,	United,	H. S. Metzger.
Loyalsock:					
367 W. H. Casselberry,	Williamsport, No. 1,				J. A. Bastian.
Lycoming:					
Matthew Dapp,	Cogan Station,				A. B. Wells.
McHenry:					
102 Samuel H. Lebo (R),	Lucullus,	R. R. Neefe,	Brookside,	Bell,	R. R. Neefe.
79 O. M. Campbell (R),	Cammal,	R. R. Neefe,	Brookside,	Bell,	R. R. Neefe.
360 Silas Hostrander,	Okome,	S. Hostrander,	Brookside,	Bell,	R. R. Neefe.
McIntyre:					
660 E. W. Reed,	Ralston,	Lycoming House,		Bell,	A. B. Wells.
784 David Chapman,	Fields,	Elisha Strouble,	Trouts Run,	Ralston,	A. B. Wells.
McNett:					
320 Charles A. Miller,	Leolyn,	O. S. Roby,	Canton,		A. B. Wells.
Mifflin:					
362 W. V. Gohl,	Jersey Shore,	2-B,	Jersey Shore,	S. & L.,	R. R. Neefe.
Mill Creek:					
107 George M. Lipp (R),	Montoursville, No. 1,	41-E,	Montoursville,	Loyalsock,	J. A. Bastian.
861 Charles E. Reeder,	Muncy, No. 2,	Edward Burns,		Loyalsock,	J. A. Bastian.
Charles W. Hill,	Muncy,				J. A. Bastian.
Montgomery Borough:					
J. R. Staib,	Montgomery,				C. E. Baer.
E. K. Sollenberger,	Montgomery,				C. E. Baer.
Thomas H. Smith,	Montgomery,				C. E. Baer.
Muncy Creek:					
795 W. Frank Bitler,	Muncy, No. 4,	W. F. Bitler,	Hughesville,	Muncy Creek,	J. A. Bastian.
Muncy:					
753 Walter Gray,	Muncy, No. 2,	33-9,	Muncy,	Bell,	J. A. Bastian.
Penn:					
Stephen Kepner,	Mawr Glen, No. 1,				J. A. Bastian.
Platt:					
N. M. Brown,	Larryville,				R. R. Neefe.
736 C. A. Reading,	Larrys Creek,	6-E,	Jersey Shore,	Commercial,	R. R. Neefe.
Pine:					
126 L. W. Rogers (R),	Waterville,	L. W. Rogers,	Jersey Shore,	Brookside,	R. R. Neefe.
540 S. P. Schneider,	Lloyd,	S. P. Schneider,	Morris,	Oregon Hill,	T. C. Harbeson.
Plunketts Creek:					
5 John A. Bastian (F),	Loyalsock,	39-F,	Montoursville,	Loyalsock,	Harrisburg.
368 T. B. Emick,	Barbours,	M. J. Fetterman,	Barbours,	United,	J. A. Bastian.

Shrewsbury:					
816 J. W. Fiester,	Tivoli,	John Boyer,		Muncy Creek,	J. A. Bastian.
Susquehanna:					
W. A. Simpson,	Nisbet,				C. E. Baer.
Upper Fairfield:					
373 Frank Reeser,	Montoursville, R. D.,	3-F,	Montoursville,	Loyalsock,	J. A. Bastian.
372 F. E. Evans,	Montoursville, No. 3,	42-H,	Montoursville,	United,	J. A. Bastian.
Washington:					
9 Charles E. Baer (F),	Elimsport,		Maple Hill,	White Deer (United)	Harrisburg.
712 C. L. Buss,	Montgomery, No. 2,	C. L. Buss,	Maple Hill,	United,	C. E. Baer.
Watson:					
21 Reuben Harer,	Jersey Shore, No. 1,	J. Ira Brown,	Avis,	Commercial,	R. R. Neefe.
Wolf:					
Ransom Plotts,	Muncy, No. 2,				J. A. Bastian.
Woodward:					
Marshall Updegraff,	Linden, No. 3,				A. B. Wells.

McKEAN COUNTY.

Bradford:					
541 E. H. Bryner,	Custer City,	1121-R-12,	Bradford,	Bell,	R. L. Emerick. Coudersport.
A. Keery,	Custer City,				R. L. Emerick.
R. D. Robison,	Custer City,				R. L. Emerick.
J. H. Johnson,	Bradford, No. 1,	209-R-4,		Bell,	R. L. Emerick.
Ceres:					
103 F. B. King,	Ceres, N. Y.,	8-F-4,	Shinglehouse,	Bell,	R. L. Emerick.
Corydon:					
Wm. Holsinger,	Stickney,				R. L. Emerick.
762 C. H. Cobb,	Shickney,				R. L. Emerick.
Eldred Borough:					
J. E. Clement,	Eldred,	F. M. Wright,	Eldred,		R. L. Emerick.
Eldred:					
J. W. Ellis,	Eldred,				R. L. Emerick.
Foster:					
C. W. Remington,	Bradford, R. D.,				R. L. Emerick.
Ernest Caswell,	Derrick City,				R. L. Emerick.
Thomas T. Fox,	Bradford,				R. L. Emerick.
Hamilton:					
Oscar Thunberg,	Ludlow,	Ludlow Post Office,			R. L. Emerick.
Hamlin:					
W. C. Blair,	Kane,				R. L. Emerick.
Wm. Swanson,	Smethport, No. 4,				R. L. Emerick.
Kane Borough:					
Wm. O'Conner,	Kane,				R. I. Emerick.
Thomas L. Kane,	Kane,				R. L. Emerick.
Keating:					
W. E. Wilson,	Cyclone,	26-R-5,	Bradford,	Bell,	R. L. Emerick.
A. G. Farley,	Smethport, No. 2,	J. W. Reed,	Farmers Valley,		R. L. Emerick.
D. M. Cooper,	Backus,				R. L. Emerick.
W. W. Willoughby,	Gifford,	26-R-6,	Bradford,		R. L. Emerick.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

McKEAN COUNTY—Continued

Township, Number, Name.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Lafayette:					
721 E. W. Penfield,	Lewis Run, R. D.,	109-R-1-3,	Bradford,	Bell,	R. L. Emerick.
Otto:					
Thomas H. Givan,	Rixford,	Exchange,		Bell,	R. L. Emerick.
Port Allegany Borough:					
Frank D. Simar,	Port Allegany,				R. L. Emerick.
Smethport Borough:					
760 F. D. Cummings,	Smethport,	F. D. Cummings,		Bell,	R. L. Emerick.

MERCER COUNTY.

Township, Number, Name.	Address.	Call.	Exchange.	Company.	Reports to.
Deer Creek:					
Ira Condit,	Clarks Mills,				Harrisburg.
Delaware:					
H. S. Stoyer,	Greenville, No. 49,				Harrisburg.
Fairview:					
J. E. Maskrey,	Fredonia,				Harrisburg.
French Creek:					
J. M. Spencer,	Sandy Lake, No. 26,	147-13,	Cochranton,	Cochranton,	Harrisburg.
Lackawannock:					
D. F. Larimer,	New Wilmington, No. 63,				Harrisburg.
Liberty:					
R. L. Buxton,	Grove City, No. 12,				Harrisburg.
Pymatuning:					
Lyman Carrier,	Transfer,	Lyman Carrier,	Transfer Union,	Pymatuning Ind.,	Harrisburg.
Sandy Creek:					
Melvin Marsteller,	Clarks Mills, No. 31,				Harrisburg.
Sandy Lake:					
J. A. Bond,	Sandy Lake,			Mercer or Bell,	Harrisburg.
Shenango:					
D. W. Sweesy,	West Middlesex, No. 61,	D. W. Sweesey,	West Middlesex,	Union,	Harrisburg.
Sugar Grove:					
C. S. Hazen,	Kennard,	8-3,	Union or Mercer,	Kennard,	Harrisburg.

West Salem:					
A. H. Burnett,	Greenville,				Harrisburg.
Wolfcreek:					
Wm. W. Wible,	Grove City, No. 15,				Harrisburg.

MIFFLIN COUNTY.

Armagh:					
59 D. Kerr Warfield (F),	Milroy,	4-12,	Reedsville,	Bell,	Harrisburg.
145 Wm. Wirth (R),	Milroy,	Ner Thompson & Son,	Reedsville,	Bell,	D. K. Warfield.
83 H. J. Dean (R),	Milroy, R. D.,	37-13,	Reedsville,	Bell,	D. K. Warfield.
529 J. A. Esh,	Milroy, R. D.,	7-2,	Reedsville,	Bell,	D. K. Warfield.
633 Clay W. Bigelow (R),	Milroy, No. 1,	37-1,	Reedsville,	Bell,	D. K. Warfield.
Bratton:					
474 J. K. Sheerer,	Mattawanna,	14,	McVeytown,	Bell (Mattawanna),	A. W. Bodine.
475 T. A. Morrow,	Mattawanna,	E. M. Harshberger,			A. W. Bodine.
535 Raymond Kauffman,	Mattawanna,	R. E. Kauffman,	McVeytown,	Bell (Mattawanna),	A. W. Bodine.
Brown:					
115 John C. Monsell (R),	Belleville, R. D.,	C. G. Milliken,	Reedsville,		T. O. Bietsch.
582 Grover C. Rhoades,	Reedsville,	J. B. Swint,	Reedsville,	Bell,	T. O. Bietsch.
John Marker,	Reedsville,				D. K. Warfield.
Decatur:					
597 W. J. Kemberling,	Wagner,	J. H. Knepp,	Lewistown,	Commercial,	D. K. Warfield.
Derry:					
478 E. L. Mertz,	Yeagertown,	Geo. P. Musser,	Lewistown,	Bell,	D. K. Warfield.
554 W. C. Bell,	Lewistown,	W. C. Bell,	Lewistown,	United,	D. K. Warfield.
Granville:					
149 R. E. McCoy (R),	Granville,		Lewistown,	Bell (Ferguson Valley).	A. W. Bodine.
470 John A. Shahen,	Lewistown, No. 1,	20-27,	McVeytown,	Bell,	A. W. Bodine.
476 W. I. Price,	Granville,	22-27,	McVeytown,	Bell,	A. W. Bodine.
537 Wm. L. Ruble,	Lewistown,	Walter Aurand,	McVeytown,	United,	D. K. Warfield.
709 S. L. Baltozer,	Mifflin, Box 108,	S. L. Baltozer,	Mifflintown and P. R. R.	P. R. R. phone,	A. W. Bodine.
683 Frank Hough,	Lewistown,	P. R. R.,	Lewistown,		A. W. Bodine.
771 S. M. Page,	Mifflin,	S. M. Page,	Mifflintown and P. R. R.	P. R. R. phone,	A. W. Bodine.
Menno:					
754 Menno H. Yoder,	Allensville,	142,		Bell,	T. O. Bietsch.
Oliver:					
471 D. F. Kirk,	McVeytown,	21-2,	McVeytown,	Bell,	A. W. Bodine.
472 D. Corbin Rupert,	McVeytown,	22-27,	McVeytown,	Bell,	A. W. Bodine.
Union:					
808 Jacob S. Fultz,	Belleville,	J. S. Fultz,	Belleville,	Farmers Line,	T. O. Bietsch.
Wayne:					
687 O. M. Sechrist,	Newton Hamilton,	Kinslow's Store,		Bell,	A. W. Bodine.
473 A. D. Wharton,	Newton Hamilton,	28-11,	McVeytown,	Bell,	A. W. Bodine.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

MONROE COUNTY.

Township or Borough, Name.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Barrett:					
258 Garritt P. Seese,	Canadensis No. 2,				J. L. Strobeck.
162 Conrad Hensler,	Canadensis,	C. E. Hensler,	Canadensis,	Cresco & Greentown,	J. L. Strobeck.
192 Harvey R. Springer,	Buck Hill Falls,	H. R. Springer,	Cresco & Canadensis,	Bell and C. & G.,	J. L. Strobeck.
182 Charles Wilson,	Mountainhome,	Sharbaugh's Store,			J. L. Strobeck.
764 W. Thos. Whittaker,	Mountainhome,	Dr. J. M. DeKay,	Mountainhome,		J. L. Strobeck.
Chestnuthill:					
800 J. K. Tittle,	Bartonsville,	McMichael's Hotel,		Monroe County,	J. L. Strobeck.
207 Andrew Kunkle,	Kunkletown No. 2,			Farmers line,	J. L. Strobeck.
Coolbaugh:					
154 Garrison Shaller,	Mount Pocono,	35-R-6,	Mount Pocono,	Bell,	J. L. Strobeck.
152 Milton Possinger,	Tobyhanna,	Lynch Bros.,	Mount Pocono,		J. L. Strobeck.
336 John Learn,	Mount Pocono,	G. H. Shaller,	Mount Pocono,	Bell,	J. L. Strobeck.
852 Isaac Miller,	Pocono,	Railroad Sta.,			J. L. Strobeck.
Delaware Water Gap Borough:					
190 E. C. Wallace,	Delaware Water Gap,	Wm. Lash, 3-R-3,		Bell,	J. L. Strobeck.
853 Stewart A. Lash,	Delaware Water Gap,	7-R-3,	Stroudsburg,	Bell,	J. L. Strobeck.
Hamilton:					
281 H. G. Brewer,	Stroudsburg No. 1,	15-11,	Bossardsville,	Pahoqua line,	J. L. Strobeck.
Jackson:					
176 Leander George,	Bartonsville No. 1,			Farmers line,	J. L. Strobeck.
Middle Smithfield:					
319 S. J. Mosier,	North Water Gap,	A. T. Shinn,	Echo Lake,	Bell,	J. L. Strobeck.
159 C. K. Primrose,	East Stroudsburg,	Marshalls Creek Sta.,	Stroudsburg,	Bell,	J. L. Strobeck.
170 Wm. Halterman,	Analomink No. 2,	Analomink,			J. L. Strobeck.
314 Charles Miller,	East Stroudsburg,	13-R-3,		Bell,	J. L. Strobeck.
Paradise:					
153 Harry C. Rowe,	Mount Pocono,	G. A. or S. Shick,		Bell and S. & B.,	J. L. Strobeck.
157 John R. Fanseen,	Mount Pocono,	G. J. Fanseen,	Mount Pocono,	Both phones,	J. L. Strobeck.
166 H. J. Detrick,	Cresco, R. D.,	23-R21,	Stroudsburg,	Bell,	J. L. Strobeck.
Pocono:					
161 Samuel T. DeHaven,	Henryville,	157, Scotrun,	Stroudsburg,	S. & B.,	J. L. Strobeck.
158 Stewart Shick,	Mount Pocono,	20-R-3, 9-12,	Mount Pocono, Stroudsburg,	Bell, S. & B.	J. L. Strobeck.
173 Otto Ruehlman,	Scotrun,	9-4,	Stroudsburg,	S. & B.,	J. L. Strobeck.
536 J. B. Clugston,	Bartonsville,	68-R-12,		Bell,	J. L. Strobeck.
Polk:					
155 John Snyder,	Jonas,	John Snyder,	Kunkletown,	Blue Ridge,	J. L. Strobeck.
Price:					
57 John L. Strobeck (F),	Analomink No. 2,	1-R-13,	Canadensis,	Cresco & Greentown,	J. L. Strobeck.
316 Henry Haase,	Analomink,				J. L. Strobeck.
539 Maurice C. Price,	Cresco,	M. C. Price,	Cresco,	Cresco & Greentown,	J. L. Strobeck.

Ross:					
160 Jacob Correll,	Saylorsburg No. 1,				J. L. Strobeck.
282 Wilson Andrew,	Saylorsburg,	O. F. Baliet Store,	Saylorsburg,		J. L. Strobeck.
Tobyhanna:					
348 John E. Bush,	Pocono Lake,				J. L. Strobeck.
871 Carl Majer,	Pocono Lake,	2-2,	Mt. Pocono,	Bell,	J. L. Strobeck.
Tunkhannock:					
174 Edwin Hawk,	Fern Ridge,	1014,	Mount Pocono,	Bell,	J. L. Strobeck.
325 Eli H. Everett,	Long Pond,				J. L. Strobeck.
851 W. F. Herman,	Long Pond,		Pocono Summit,	Bell,	J. L. Strobeck.

MONTGOMERY COUNTY.

Douglass:					
A. L. Bauer,	Congo,				Harrisburg.
Frederick:					
Jeremiah N. Shelly,	Zieglerville,	J. N. Shelly,	Schwencksille,	Bell,	Harrisburg.
Lower Pottsgrove:					
R. H. Spare, Jr.,	Pottstown,	810, 88, 355-W,	Pottstown,	Bell,	Harrisburg.
Marlborough:					
Chas. M. Hendricks,	Hoppenville,				Harrisburg.
New Hanover:					
Jacob S. Herpel,	Perkiomenville, R. D.,				Harrisburg.
Salford:					
A. G. Godshall,	Morwood,	33-2,	Souderton,	Bell,	Harrisburg.
Upper Hanover:					
Oliver S. Bieler,	East Greenville No. 1,				Harrisburg.
Upper Salford:					
Joseph M. Groff,	Salfordville,				Harrisburg.

MONTOUR COUNTY.

Anthony:					
U. Myers Bitler,	Ottawa,	U. M. Bitler,	Turbotville,	United,	Harrisburg.
Cooper:					
Alonzo Mauser,	Danville No. 4,	21-4,	Bloomsburg,	United,	Harrisburg.
Danville Borough:					
J. H. Woodside,	Danville,				Harrisburg.
Liberty:					
C. H. Diehl,	Pottsgrove,		Milton,	Bell,	Harrisburg.
Limestone:					
Judson Derr,	Milton No. 1,				Harrisburg.
Mayberry:					
Wm. E. Bird,	Danville No. 6,	7-R,	Eleysburg,	Farmers United,	Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

MONTOUR COUNTY—Continued.

Township or Borough, Name.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Valley:					
Raymond M. Pursel,	Danville,				Harrisburg.
Washingtonville Borough:					
Geo. B. Holdren,	Washingtonville,				Harrisburg.
West Hemlock:					
H. C. Sandel,	Danville,	H. C. Sandel,	Strawberry Ridge,	United,	Harrisburg.

NORTHAMPTON COUNTY.

Township or Borough, Name.	Address.	Call.	Exchange.	Company.	Reports to
Bath Borough:					
Samuel R. Miller,	Bath,	8-B-2,	Bath,	Slate Belt,	Harrisburg.
Bethlehem:					
Edwin A. Berkey,	Easton No. 3,				Harrisburg.
Bushkill:					
Timothy Davidson,	Nazareth No. 2,				Harrisburg.
Chapman Borough:					
Roscoe H. Smith,	Chapman Quarries,	Chapman Slate Co.,			Harrisburg.
East Allen:					
George J. Kuntz,	Bath, R. D.,				Harrisburg.
Freemansburg Borough:					
Irvin Getter,	Freemansburg,				Harrisburg.
Hellertown Borough:					
Titus M. Ruch,	Hellertown,				Harrisburg.
Lehigh:					
R. E. Mummey,	Walnutport,	Pennsylvania House,	Walnutport,	Bell or Lehigh,	Harrisburg.
Geo. F. Vogel,	Danielsville,				Harrisburg.
Lower Saucon:					
Theodore L. Laubach,	Hellertown No. 1,				Harrisburg.
North Catasauqua:					
William Beverland,	Catasauqua,	D. H. Harris, 27-A,		Consolidated,	Harrisburg.
Palmer:					
John J. Bunstein,	2424 Butler St., Easton.				Harrisburg.
South Bethlehem Borough:					
G. P. Roach,	S. Bethlehem,				Harrisburg.

Upper Mt. Bethel:					
901 Clayton Lambert,	Bangor No. 3,	32-R,	Richmond,	Mt. Bethel,	J. L. Strobeck.
854 Samuel J. Cooper,	Portland,				J. L. Strobeck.
Walnutport Borough:					
Alfred J. Andrews,	Walnutport,	66-4,	Slatington,	Bell,	Harrisburg.
E. E. Vogel,	Walnutport,				Harrisburg.
Washington:					
Freeman Brodt,	Ackermanville,				Harrisburg.

NORTHUMBERLAND COUNTY.

Coal:					
Geo. H. Brady,	Shamokin No. 2,				Harrisburg.
John H. Strausser,	Shamokin,				Harrisburg.
Geo. S. Miller,	Shamokin,				Harrisburg.
East Chillisquaque:					
John L. Voris,	Pottsgrove,				Harrisburg.
Jordan:					
W. R. Schadel,	Pillow No. 1,	A. J. Schwahn, 12-4-B,	Klingerstown,	M. M. Co.,	Harrisburg.
Lower Augusta:					
Henry C. Dewitt,	Fishers Ferry,	927-3,	Sunbury,	Bell,	Harrisburg.
Harry E. Phillips,	Fishers Ferry,	917-2,	Sunbury,	Bell,	Harrisburg.
Lower Mahanoy:					
J. W. Bettleyon,	Dalmatia,				Harrisburg.
Marion Heights Borough:					
Victor Merretta,	Kaiser,				Harrisburg.
Rush:					
Joseph M. Cherry,	Danville No. 6,				Harrisburg.
Shamokin Borough:					
Reuben Keiser,	Shamokin,				Harrisburg.
Shamokin:					
A. H. Swank,	Paxinos No. 1,	2-22,	Seven Points,	United,	Harrisburg.
Snydertown Borough:					
E. C. Wagner,	Sunbury No. 1,	23-12,	Elysburg,	Bell,	Harrisburg.
Upper Augusta:					
H. C. Forrester,	Sunbury No. 1,				Harrisburg.
Upper Mahanoy:					
J. B. Koppenhaver,	Leck Kill,				Harrisburg.
Washington:					
H. C. Heffelfinger,	Dornsife No. 1,	10-2-B,	Mandata,	M. & M.,	Harrisburg.
Watsontown Borough:					
Wm. H. Gold,	Watsontown,	56-B-2,	Watsontown,	Bell,	Harrisburg.
West Chillisquaque:					
791 George Heddings,	Milton,	L. Hartman,	Lewisburg,	Bell,	Harrisburg.
Zerbe:					
Benj. Machamer,	Trevorton,	B. F. Deppen,	Mandata,		Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

PERRY COUNTY.

Township or Borough, Name.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Blain Borough:					
377 D. W. Sheaffer,	Blain,		Blain,	Perry County,	H. E. Bryner.
Buffalo:					
865 S. I. Rhoads,	Montgomery Ferry,	Shuler's Store,		United,	H. E. Bryner.
837 Wm. H. Hebel,	Liverpool No. 2,	Wm. H. Hebel,	Liverpool,	Pfoutz Valley,	H. E. Bryner.
836 G. B. M. Bair,	Newport No. 3,	G. B. M. Bair,	Newport,	C. V.,	H. E. Bryner.
Carroll:					
778 James Baxter,	New Bloomfield,	John Bruner,		Perry County,	H. E. Bryner.
777 Eli D. Sloop,	Shermansdale,	Exchange,	Shermansdale,	Bell,	H. E. Bryner.
Center:					
776 Jacob Myers,	Newport,	J. Myers,	Newport,	Bell,	H. E. Bryner.
Greenwood:					
841 J. R. Wright,	Millerstown,	A. N. Ulsh,	Millerstown,		H. E. Bryner.
Jackson:					
137 F. P. Sundy (R),	McCrea,	F. P. Sundy,	Loysville,	Perry County,	H. E. Bryner.
Juniata:					
856 J. A. Turnbaugh,	Newport No. 2,	J. A. Turnbaugh,	Newport,	Perry County,	H. E. Bryner.
Liverpool:					
838 Henry Grubb,	Millerstown No. 1,	Centerville,	Liverpool,	Bell,	H. E. Bryner.
839 Geo. C. Long,	Liverpool, R. D.,	Geo. C. Long,	Liverpool,	Pfoutz Valley,	H. E. Bryner.
Madison:					
432 George L. Mumper,	Andersonburg R. D.,	G. L. Mumper,	Blain,	Perry County,	H. E. Bryner.
442 G. Frank Mohler,	Honey Grove,		Honey Grove,	Orbisonia,	H. E. Bryner.
572 M. G. Hench,	Landisburg, R. D.,	J. E. Waggoner,	Bloomfield,		H. E. Bryner.
468 Amos W. Reed,	Andersonburg,	W. C. Smith,	Loysville,	Bell,	H. E. Bryner.
867 K. P. Smith,	Ickesburg,	R. B. Rodgers,	Saville,	Bell,	H. E. Bryner.
Miller:					
786 Charles O. Houck,	Duncannon No. 3,		Newport,	Bell,	H. E. Bryner.
Oliver:					
858 D. M. Ehrhart,	Newport No. 2,				H. E. Bryner.
Penn:					
780 James E. Nickum,	Duncannon,	Exchange,	Duncannon,	Bell,	H. E. Bryner.
786 S. W. Miller,	Duncannon No. 2,	S. W. Miller,	Duncannon,	Perry County,	H. E. Bryner.
Rye:					
774 A. R. White,	Marysville No. 1,	189,	Marysville,	United,	H. E. Bryner.
Saville:					
863 Jacob F. Reisinger,	Ickesburg,	Rice's Store,	Ickesburg,		H. E. Bryner.
781 Jacob A. Snyder,	Elliottsburg No. 1,	J. A. Snyder,	New Bloomfield,	Bell,	H. E. Bryner.

Spring:					
775 E. O. Dile,	Elliottsburg,	E. O. Dile,	New Bloomfield,	Perry County,	H. E. Bryner.
Toboyne:					
68 John L. Witherow (F),	East Waterford,	J. H. Kirk,	Port Royal,		Harrisburg.
10 H. E. Bryner (F),	New Germantown,	H. E. Bryner,	Loysville,	Perry County,	Harrisburg.
101 Leroy Koonts (R),	New Germantown,	H. E. Bryner,			H. E. Bryner.
91 Herman N. Hart (R),	New Germantown,	H. E. Bryner,			H. E. Bryner.
441 John H. Zeigler,	East Waterford,	Phone at Concord,			J. L. Witherow.
81 Walter Leach (F),	New Germantown,				H. E. Bryner.
Tuscarora:					
857 J. G. Hampton,	Millerstown No. 4,	Horace Kerr,	Millerstown,	United,	H. E. Bryner.
856 D. M. Hench,	Millerstown No. 4,	Jones' Store,			H. E. Bryner.
		Donnally's Mill,			
859 T. J. Kremer,	Millerstown No. 4,	H. S. Bratton,			H. E. Bryner.
Tyrone:					
598 Harry P. Cornman,	Landisburg No. 1,	Hotel Dempsey,	Loysville,		H. E. Bryner.
876 B. F. Lightner,	Landisburg,	Harvey Clouse,	Loysville,	Bell,	H. E. Bryner.
782 H. M. Lightner,	Landisburg,	H. M. Lightner,	Loysville,	Perry County,	H. E. Bryner.
Watts:					
840 Allen R. Thompson,	Duncannon No. 4,	Exchange,	Duncannon,	United,	H. E. Bryner.
		Exchange,	New Buffalo,	Local.	
Wheatfield:					
783 Chester E. Burd,	Duncannon No. 8,	Pumping Station,	Sulphur Springs,	Bell,	H. E. Bryner.

PIKE COUNTY.

Blooming Grove:					
2 John E. Avery (F),	Notch,	47-23,	Hawley,	Lord's Valley,	Harrisburg.
93 Wm. Hatton (R),	Lord's Valley,	Robert Pierson,	Hawley,	Lord's Valley,	J. E. Avery.
578 R. S. Lord,	Lord's Valley,	47-11,	Hawley,	Lord's Valley,	J. E. Avery.
Delaware:					
480 Thomas Shepherd,	Dingmans Ferry,	15-F-2,	Dingmans Ferry,	Van Pike,	J. E. Avery.
563 Earl E. Raitt,	Dingmans Ferry,	A. M. Adams,	Dingmans Ferry,		J. E. Avery.
Dingman:					
481 Julius W. Kiesel,	Milford No. 1,	J. W. Kiesel,	Bell,	Van Pike,	J. E. Avery.
483 E. H. Orben,	Milford No. 1,	75-F-2,	Bell,	Van Pike,	J. E. Avery.
528 Louis J. Husson,	Milford No. 1,	75-F-21,	Milford,	New York,	J. E. Avery.
562 Fred Gebhardt,	Milford,	134-3,	Bell,	Van Pike,	J. E. Avery.
Greene:					
58 Robert W. Stadden (F),	Canadensis, R. D.,	R. W. Stadden,	Newfoundland,	Wynooska,	Harrisburg.
143 Edgar Wilson (R),	Canadensis, R. D.,	Edgar Wilson,	Newfoundland,	Wynooska,	R. W. Stadden.
485 Thomas H. Gilpin, Jr.,	Greentown,	J. R. Gilpin,	Newfoundland,	Wynooska,	R. W. Stadden.
869 Geo. J. Heberling,	Panther,				R. W. Stadden.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

PIKE COUNTY—Continued.

Township or Borough, Name.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Lackawaxen:					
482 C. R. Rosencrance,	Greeley,	42,	Lackawaxen,	L. & H.,	J. E. Avery.
902 Willis L. Simonson,	Masthope,	42-U,	Hawley,	Bell,	R. W. Stadden.
Lehman:					
412 Warren Stout,	Bushkill,	70-M,	Stroudsburg,	Bell,	J. L. Strobeck.
273 Wm. Mink,	Bushkill,	Exchange,	Forest Park,		J. L. Strobeck.
Matamoras Borough:					
512 Thomas C. Manwaring,	Matamoras,	Debhart, 474-W,	Matamoras,	Port Jervis,	J. E. Avery.
Milford Borough:					
124 E. T. Riviere (R),	Milford,	E. T. Riviere,		Van Pike,	J. E. Avery.
596 Daniel B. Olmstead,	Milford,	Crissman House,	Milford,	Van Pike,	J. E. Avery.
Milford:					
583 William W. Drake,	Milford,	83-F-4,	Milford,	Van Pike,	J. E. Avery.
Palmyra:					
870 Henry T. Gumble,	Paupack,	H. T. Gumble,	Hawley,	Bell,	R. W. Stadden.
Porter:					
88 Ferdinand Frank (R),	Edgemere,	33-S-11,	Dingman,	Van Pike,	J. E. Avery.
Shohola:					
484 Henry Bradford,	Parkers Glen,	H. Bradford,	Milford,	Van Pike,	J. E. Avery.

POTTER COUNTY.

Abbott:					
58 Harry C. VanHorn (F),	Carter Camp,	H. C. Van Horn,	Germania (Bell),	Elk Run,	R. L. Emerick.
141 Harry VanCleve (R),	Crossfork, R. D.,	H. Van Cleve,	Germania (Bell),	Dept. of Forestry,	H. C. Van Horn.
227 August Bratz,	Crossfork,	A. Bratz,	Germania (Bell),	Elk Run,	H. C. Van Horn.
252 J. R. Niklaus,	Germania,				R. L. Emerick.
Allegany:					
254 A. C. Woodcock,	Raymond		Raymond,	Bell,	R. L. Emerick.
226 Emil Mosch,	Coudersport No. 3,	900-5,	Bell,	Currier line,	R. L. Emerick.
Austin Borough:					
22 P. Hartman Fox (F),	Austin,	6-R,	Austin,	Bell,	R. L. Emerick.

Bingham:					
228 Bert Bacon,	West Bingham,	Central,	West Bingham,	Both phones,	R. L. Emerick.
Clara:					
229 Harvey Wakley,	Roulette No. 1,	H. Wakley,	Millport,	Clara,	R. L. Emerick.
230 A. A. Fessenden,	Roulette No. 1,	A. A. Fessenden,	Roulette,	Bell,	R. L. Emerick.
Coudersport Borough:					
18 R. Lynn Emerick (F),	Coudersport,	157-R or 164-W,	Coudersport,	Bell,	Harrisburg.
East Fork District of Eulalia:					
46 George S. Perry (F),	Conrad,	G. S. Perry, Hotel at Hull,	Germania (Bell), Coudersport (?),	Dept. of Forestry, Bell.	R. L. Emerick.
231 H. W. Robinson,	Conrad,	G. S. Perry,			G. S. Perry.
Eulalia:					
232 Milton Moshier,	Coudersport,	905-31,	Coudersport,	Bell,	R. L. Emerick.
224 B. A. Matteson,	Coudersport,	901-12,	Coudersport,	Bell,	R. L. Emerick.
Galeton Borough:					
524 Frank D. Leach,	Galeton,	60-J,	Galeton,	Bell,	R. L. Emerick.
Genesee:					
233 A. B. Coller,	Ellisburg,	A. B. Coller,	Genessee,	Bell,	R. L. Emerick.
Harrison:					
345 J. H. Harrison,	Harison Valley,	Hotel Erway,		Bell,	R. L. Emerick.
Hebron:					
271 M. A. Harvey,	Coudersport,	900-21,	Coudersport,	Bell,	R. L. Emerick.
861 O. D. Bly,	Coudersport No. 2,	907-5,	Shinglehouse,	Bell,	R. L. Emerick.
Hector:					
246 W. G. Mays,	Sunderlinville,	W. G. Mays,	Bell,	Wilkinson,	R. L. Emerick.
247 Ray H. Loucks,	Ulysses No. 2,	R. H. Loucks,	Ulysses or Sunderlinville.	Loucks Mills,	R. L. Emerick.
Homer:					
509 Alvin J. Quimby,	Coudersport,	911-33,	Coudersport,	Bell,	P. H. Fox.
248 John Bloomer,	Coudersport,	902-5,	Coudersport,	Bell,	P. H. Fox.
Keating:					
87 M. A. Fourness (R),	Coudersport,	17-R-3,	Austin,	Bell,	P. H. Fox.
249 F. H. Hoffmeister,	Keating Summit,	Keating Summit,		Bell,	P. H. Fox.
251 J. B. Bundy,	Coudersport No. 6,	911-11,	Coudersport,	Bell,	R. L. Emerick.
Sharon:					
352 Charles Allen,	Shinglehouse,	60-X,	Shinglehouse,	Federal,	R. L. Emerick.
581 Wm. H. Scoville,	Millport,	Wm. Scoville,	Bell,	Local,	R. L. Emerick.
Oswayo borough:					
234 E. E. Bunker,	Oswayo,	E. E. Bunker,	Bell,	Oswayo,	R. L. Emerick.
Oswayo:					
235 Charles H. Kemp,	Millport,	C. H. Kemp,	Bell,	Farmers,	R. L. Emerick.
Pike:					
236 John H. Page,	Galeton No. 2,	J. H. Page,	Westfield,	Sunderlinville,	R. L. Emerick.
Pleasant Valley:					
510 Fred Wambold,	Port Allegany No. 3,	F. F. Wambold,	Burtville,	Bell,	R. L. Emerick.
Portage:					
260 Isaac Stuckey,	Keating Summit, R. D.	P. H. Fox,			P. H. Fox.
Roulette:					
323 E. E. Ludwig,	Keating Summit,	W. B. Evans,	Emporium,	Bell,	W. B. Evans.
237 Lewis P. Fessenden,	Roulette No. 2,	10-R-5,	Roulette,	Bell,	R. L. Emerick.
Shinglehouse Borough:					
238 C. H. Cole,	Shinglehouse,	C. H. Cole,	Shinglehouse,	Federal,	R. L. Emerick.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

POTTER COUNTY—Continued.

Township or Borough, Name.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Stewardson:					
23 Thomas H. Golden (F),	Crossfork,	T. H. Golden,	Germania (Bell),	Dept. of Forestry,	R. L. Emerick.
100 Milton Keeney (R),	Crossfork,	M. Keeney,	Germania (Bell),	Dept. of Forestry,	T. H. Golden.
118 Henry M. Olson (R),	Crossfork, R. D.,	H. M. Olson,	Germania (Bell),	Dept. of Forestry,	T. H. Golden.
239 Edward Caldwell,	Crossfork,	Jones Hotel,	Germania,	Bell,	T. H. Golden.
Summit:					
71 Arthur W. Ayers (R),	Costello No. 1,	A. W. Ayers,	Germania (Bell),	Dept. of Forestry,	G. S. Perry.
240 Albert O. Baker,	Costello No. 1,	Mrs. Leroy Haskins,		Farmers line,	G. S. Perry.
241 Charles P. Ayers,	Coudersport No. 5,	904-12,	Coudersport,	Bell,	R. L. Emerick.
Sweden:					
243 Charles F. Wells,	Condersport No. 4,	9044,	Coudersport,	Bell,	R. L. Emerick.
242 A. W. Snyder,	Coudersport No. 3,	909-11,	Coudersport,	Bell,	R. L. Emerick.
Sylvania:					
225 C. R. Glover,	Costello,	McGee Miller,	Costello,		P. H. Fox.
244 Charles Pierce,	Costello,	1-31,	Costello,	Bell,	P. H. Fox.
Ulysses:					
520 George F. Wright,	Gold,	G. F. Wright,	Gold,	Gold,	R. L. Emerick.
West Branch:					
353 Miles A. Conable,	Galeton No. 1,	F. Burrows,		Bell,	R. L. Emerick.
Wharton:					
253 George A. Mahon,	Wharton,				R. L. Emerick.
334 C. E. Brooks,	Costello,				G. S. Perry.

SCHUYLKILL COUNTY.

Ashland Borough:					
John J. Conner,	Ashland,				J. E. McNeal, 616 Washington St., Reading.
Barry:					
C. B. Maurer,	Mowry,	Irvin B. Zeigenfuse,		Bell,	J. E. McNeal.
Blythe:					
Alexander J. Devine,	Cumbola,				J. E. McNeal.

Cass:					
William W. Watts,	Minersville,	Oak Hill Coal Co.	Minersville,	14-J,	J. E. McNeal.
Coal Dale Borough:					
David Yemne, Jr.,	Coal Dale,				J. E. McNeal.
East Brunswick:					
David Turner,	New Ringgold,				J. E. McNeal.
East Union:					
Milton Houser,	Brandonville,				J. E. McNeal.
Eldred:					
Charles H. Morgan,	Pitman,	W. W. Romberger,	Pitman,	Bell,	J. E. McNeal.
Gilberton Borough,					
Thomas L. Bevan,	Gilberton,				J. E. McNeal.
Girardville Borough:					
Harry Toll,	Girardville,				J. E. McNeal.
Hubley:					
Robert W. Bowman,	Spring Glen,				J. E. McNeal.
Kline:					
Frank P. Bruno,	Kelayres,	25-R-12,	McAdoo,	Bell,	J. E. McNeal.
Landingville Borough:					
John Maine,	Landingville,				J. E. McNeal.
Mt. Carbon Borough:					
Frank Erb,	Pottsville,				J. E. McNeal.
Mahanoy City:					
Samuel C. Samuels,	Mahanoy City,				J. E. McNeal.
Mahanoy:					
Wm. R. Craig,	New Boston,				J. E. McNeal.
Middleport Borough:					
John Callaway,	Middleport,				J. E. McNeal.
Minersville Borough:					
Martin Boyer,	Minersville,				J. E. McNeal.
McAdoo Borough:					
E. W. Klingerman,	McAdoo,	8-11,	Hazleton,	Consolidated & Bell,	J. E. McNeal.
Mahantongo:					
I. R. Troutman,	Klingerstown,	John Leitzel or H. O. Umholtz.	Mandata,	M. & M.,	J. E. McNeal.
New Ringgold Borough:					
D. Vetter,	New Ringgold,				J. E. McNeal.
North Union:					
Frank Wharmby,	Nuremberg,	Frank Wharmby,	Hazleton & Conyngham.	Bell & Consolidated,	J. E. McNeal.
New Philadelphia Borough					
Matthew Fogarty,	Silver Creek,				J. E. McNeal.
Orwigsburg Borough:					
W. H. H. Moyer,	Orwigsburg,				J. E. McNeal.
Pottsville Borough:					
Edward Gormley,	Pottsville,				J. E. McNeal.
Rahn:					
William Valentine,	Tamaqua,				J. E. McNeal.
Reilly:					
Oscar Kessler,	Zerbe,		Bell,	Bell,	J. E. McNeal.
Ryan:					
Albert Ellis,	Barnesville, R. D.,	20 x 76,	Mahanoy City,	Bell,	J. E. McNeal.
Rush:					
John F. Brill,	Barnesville,				J. E. McNeal.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

SCHUYLKILL COUNTY—Continued.

Township or Borough, Name.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
South Manheim:					
Oliver Wagner,	Schuylkill Haven,				J. E. McNeal.
St. Clair Borough:					
847 Theodore Weiss,	St. Clair,	A. T. Jenkins,	Pottsville,		J. E. McNeal.
Shenandoah Borough:					
Cyrus Geise,	Shenandoah,				J. E. McNeal.
Tremont Borough:					
Fred Hopstetter,	Tremont,				J. E. McNeal.
Union:					
John P. Shoup,	Ringtown No. 1,	John P. Shoup,	Ringtown,	Farmers Independent,	J. E. McNeal.
Walker:					
Samuel Heisler,	Tamaqua No. 1,				J. E. McNeal.
Wayne:					
Harry N. Dietrich,	Cressona No. 2,	722,	Deturksville,	Bell,	J. E. McNeal.
West Brunswick:					
Frank Koenig,	Orwigsburg No. 2,		Auburn, Orwigsburg,	Bell, United.	J. E. McNeal.
West Mahanoy:					
Thomas May,	Shaft,	Depuw Store,			J. E. McNeal.
William Heffner,	Girardville,	Girard Estate Office,		Bell & Schuylkill,	J. E. McNeal.

SNYDER COUNTY.

Township or Borough, Name.	Address.	Call.	Exchange.	Company.	Reports to
Adams:					
4 Walter J. Bartschat (F),	Troxelville,	7-U,	Beaver Springs,	C. V.,	Harrisburg.
27 Jesse M. Houtz (F),	Troxelville,	7-L,	Beaver Springs,	Commercial,	W. J. Bartschat.
114 C. J. Middlesworth (R),	Troxelville,	7-U,	Beaver Springs,	C. V.,	W. J. Bartschat.
85 Wm. H. Ettinger (R),	Beavertown No. 1,	36-3,	Middleburg,	Bell,	W. J. Bartschat.
899 Ross E. Erb,	Troxelville,	39-3,	Adamsburg,	Bell,	W. J. Bartschat.
Beaver:					
267 Wm. R. Howell,	Beavertown,	C. I. Watson,		Both phones,	W. J. Bartschat.
268 E. J. Erb,	Middleburg No. 1,				W. J. Bartschat.
Centre:					
266 L. A. Stine,	Penns Creek,		Middleburg,	Bell,	W. J. Bartschat.
265 Josh F. Bingaman,	Middleburg No. 2,	J. T. Herman,	Middleburg,	Bell,	W. J. Bartschat.

Chapman:					
J. Kohler Peck,	McKees Half Falls,				Harrisburg.
Franklin:					
264 John G. Reigle,	Paxtonville,	Boyer & Graybill Store at Paxtonville.			W. J. Bartschat.
263 W. W. Bruner,	Paxtonville,	Boyer & Graybill Store at Paxtonville.			W. J. Bartschat.
Jackson:					
720 Peter Heiser,	Kratzerville,		Selinsgrove,	Bell,	A. C. Silvius.
Middle Creek:					
738 Charles Conley,	Kreamer,	J. E. Magee,	Kreamer,		W. J. Bartschat.
Monroe:					
H. A. Herman,	Selinsgrove No. 1,				A. C. Silvius.
Penn:					
I. L. Luck,	Selinsgrove,				A. C. Silvius.
Perry:					
269 Harvey J. Heim,	Mt. Pleasant Mills,	P. A. Reichenbach,	Selinsgrove,	Bell,	Harrisburg.
Spring:					
109 W. C. Maurer (R),	Beaver Springs No. 1,	5-N,	Adamsburg,	C. V.,	W. J. Bartschat.
261 W. I. Woodling,	Beaver Springs,	W. H. Mitchell,	Beaver Springs,	United,	W. J. Bartschat.
262 C. C. Gross,	Beaver Springs,	Benfers Mill,	Beaver Springs,		W. J. Bartschat.
Washington:					
739 J. M. Hornberger,	Middleburg,	62,	Freemont,	United,	W. J. Bartschat.
740 Henry W. Straub,	Mt. Pleasant Mills,	62,	Freemont,	United,	W. J. Bartschat.
West Perry:					
69 J. W. Amig (R),	Richfield,	B. W. Nace,	McAlisterville,	Both phones,	Harrisburg.
270 J. Z. Strauser,	Richfield,				Harrisburg.

SOMERSET COUNTY.

Benson Borough:					
566 G. P. Benson,	Hollsopple,	G. P. Benson,	Hollsopple,	Somerset,	V. M. Bearer. Ligonier.
567 C. J. Lehman,	Hollsopple,	C. J. Lehman,	Hollsopple,	Johnstown,	V. M. Bearer.
Berlin Borough:					
750 George W. Buckman,	Berlin,	G. W. Buckman,	Economy,	Economy and Bell,	V. M. Bearer.
Black:					
695 Adam A. Baker,	Rockwood,	Wilson Creek,		Somerset,	V. M. Bearer.
Boswell Borough:					
557 Ed. Gonder,	Boswell,	Ed. Gonder,		Somerset,	V. M. Bearer.
Brothersvalley:					
769 S. P. Miller,	Berlin,	23-22,		Bell,	V. M. Bearer.
Confluence Borough:					
691 E. S. Thomas,	Confluence,	Exchange,		Bell,	V. M. Bearer.
Elk Lick:					
689 J. S. Stevanus,	Springs,	J. S. Stevanus,		Mutual,	V. M. Bearer.
Fairhope:					
696 Edgar W. Emrick,	Fairhope,	J. A. Lowry,			V. M. Bearer.
Garrett Borough:					
751 U. S. Shober,	Garrett,	U. S. Shober,	Somerset,	Bell,	V. M. Bearer.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

SOMERSET COUNTY—Continued.

Township or Borough, Name.	Address.	Telephone through which warden can be reached.			Reports to
		Call.	Exchange.	Company.	
Greenville:					
687 A. E. Baer,	Sand Patch,	A. E. Baer,	Pocahontas,	Economy, Farmers Mutual,	V. M. Bearer.
Hooversville Borough:					
732 Jerry Armagost,	Hooversville,	J. M. Armogast,		Bell,	V. M. Bearer.
Jefferson:					
73 Wilson R. Barndt R),	Somerset No. 3,	W. R. Barndt,	Bakersville,	Jefferson,	V. M. Bearer.
508 Charles I. Gardner,	Somerset No. 3,	C. I. Gardner,	Bell or Economy,	Jefferson.	
505 John H. Sarver,	Somerset No. 3,				V. M. Bearer.
506 Edward Zufall,	Somerset No. 3,	W. E. Zufall,	Bakersville,	Jefferson,	V. M. Bearer.
507 Nelson G. Moore,	Kuhn,	N. G. Moore,	Bell,	Economy,	V. M. Bearer.
Jenner:					
501 W. G. Baker,	Boswell No. 2,	Charles Bell,		Lincoln Mutual,	V. M. Bearer.
502 Harvey Lohr,	Somerset No. 2,	J. H. Lohr,	Bell,	North Fork,	V. M. Bearer.
Jennertown Borough:					
603 Lee Rauch,	Jennertown,	63-A-11,	Boswell,	Somerset,	V. M. Bearer.
607 Walter Hoffman,	Jennertown,	W. Hoffman,	Boswell,	Somerset,	V. M. Bearer.
Larimer:					
690 George W. Tressler,	Sand Patch,	12-22,	Meyersdale,	Larimer,	V. M. Bearer.
Lincoln:					
503 Edward H. Shaulis,	Somerset No. 3,	E. H. Shaulis,	Somerset,	Economy,	V. M. Bearer.
504 H. W. Shaulis,	Somerset No. 3,	E. H. Shaulis,	Bell,	Jefferson,	V. M. Bearer.
Lower Turkeyfoot:					
719 Alvin Burnworth,	Confluence,	Confluence Hotel,			V. M. Bearer.
694 James W. Tannehill,	Ursina,	S. B. Alcot. Store,		Bell,	V. M. Bearer.
733 John S. Thomas,	Confluence No. 1,	Draketown Water Co.			V. M. Bearer.
Middlecreek:					
692 D. A. Barron,	Rockwood No. 2,	D. A. Barron,	Rockwood,	Economy,	V. M. Bearer.
Milford:					
763 M. O. Wolfersberger,	Rockwood No. 1,	Mrs. H. L. Hay,		Economy,	V. M. Bearer.
Northampton:					
723 H. W. Beachy,	Glencoe,	F. W. Webreck,			V. M. Bearer.
731 Edison Brick,	Glencoe,	R-32,		Northampton,	V. M. Bearer.
Ogle:					
734 D. H. Whitaker,	Rummell,	238-11,	Windber,		V. M. Bearer.
Quemahoning:					
614 Albert S. Hoffman,	Hooversville No. 1,	14,		Economy,	V. M. Bearer.
Shade:					
713 George R. Wechtenhiser,	Cairnbrook No. 1,	G. R. Wechtenhiser,	Hooversville,	Central,	V. M. Bearer.

Somerset:					
759 John G. Bender,	Friedens,		Somerset,	Bell, Somerset, Economy.	V. M. Bearer.
Southampton:					
688 Harry I. Troutman,	Sand Patch No. 2,	H. I. Troutman,	Kendall,	Larimer,	V. M. Bearer.
Stonycreek:					
752 Wm. H. Foy,	Shanksville,	Wm. H. Foy,		Economy,	V. M. Bearer.
Summit:					
718 Russell J. Engle,	Meyersdale,	R. J. Engle,		Bell,	V. M. Bearer.
Upper Turkeyfoot:					
724 H. Reid Weimer,	Casselman,	H. Reid Weimer,	Rockwood,	Economy and Somerset.	V. M. Bearer.
Windber Borough:					
693 J. H. Hummell,	Windber,	125-L,	Bell,	Windber,	V. M. Bearer.

SULLIVAN COUNTY.

Cherry:					
812 P. F. McGee,	Dushore No. 1,	11-3,	Dushore,	Bell,	John A. Bastian. Harrisburg, Pa.
820 Chas. W. Morter,	Mildred,	L. J. Lowry,	Dushore,	Bell,	John A. Bastian.
819 Daniel R. Morter,	Mildred,	L. J. Lowry,			John A. Bastian.
Colley:					
818 Otto Behr,	Lopez,	McGee Hotel,			John A. Bastian.
817 W. L. Dyer,	Dushore,	19-14,	Dushore,	Bell,	John A. Bastian.
813 Wilson Kibler,	Ricketts,	W. Kibler,	Dushore,	Bell,	John A. Bastian.
880 Thomas Kille,	Lopes,	Dr. Christian,	Dushore,	Bell,	John A. Bastian.
Eaglesmere Borough:					
882 J. W. Aumiller,	Eaglesmere,	Exchange,	Eaglesmere,	Bell,	John A. Bastian.
Elkland:					
879 G. F. Hugo,	Campbellsville,	Henry Fawsett,	Estella,	Independent,	John A. Bastian.
884 W. T. Moore,	Forksville No. 2,	W. T. More,	Estella,	Independent,	John A. Bastian.
Forks:					
878 G. W. Kester,	Campbellsville,	G. W. Kester,	New Albany,	Bell,	John A. Bastian.
883 A. T. Wilcox,	Forksville,	A. T. Wilcox,	Estella,	Independent,	John A. Bastian.
Fox:					
849 J. W. Frey,	Wheelerville,	M. E. Morgan,	Shunk,		John A. Bastian.
Hillsgrove:					
877 Samuel Darby,	Hillsgrove,	Samuel Darby,	Hillsgrove,	United,	John A. Bastian.
876 Samuel Snell,	Hillsgrove,	Samuel Snell,	Estella,	United,	John A. Bastian.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

SULLIVAN COUNTY—Continued.

Township. Name. Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Laporte.					
814 Geo. A. Gorman,	Sonestown No. 1,	G. A. Gorman,	Nordmont,	Bell Farmers Line,	John A. Bastian.
881 Henry Karge,	Laporte,	Laporte Station,		American,	John A. Bastian.
815 Minard Peterman,	Sonestown,	Minard Peterman,	Nordmont,	Independent,	John A. Bastian.
875 John Walsh,	Dushore No. 2,	McGee Hotel,	Satersfield,		John A. Bastian.

SUSQUEHANNA COUNTY.

Township. Name. Number.	Address.	Call.	Exchange.	Company.	Reports to.
Apolacon:					
John Heffron,	Little Meadows,				Harrisburg.
Auburn:					
P. B. Lome,	Retta,				Harrisburg.
Bridgewater:					
G. M. Darrow,	Montrose No. 3,				Harrisburg.
Brooklyn:					
L. Tewksbury,	Brooklyn,				Harrisburg.
Choconut:					
Patrick Dean,	Choconut,	Patrick Dean,		Bell,	Harrisburg.
Dimock:					
J. A. West,	South Montrose No. 1,				Harrisburg.
Forest Lake:					
Jesse Edwards,	Birchardville,				Harrisburg.
Forest City Borough:					
R. S. Inglis,	Forest City,				Harrisburg.
Friendsville Borough:					
James McMahon,	Friendsville,				Harrisburg.
Gibson:					
F. F. Ressequie,	South Gibson,				Harrisburg.
Great Bend:					
William Newman,	Great Bend,	Wm. Newman,		North Eastern,	Harrisburg.
Great Bend Borough:					
W. S. Kistler,	Great Bend,				Harrisburg.

Hallstead Borough:					
Elmer Decker,	Hallstead,				Harrisburg.
Harford:					
H. A. Robbins,	Harford,				Harrisburg.
Harmony:					
I. S. Johnson,	Thompson No. 3,	I. S. Johnson, I. S. Johnson,	Susquehanna, Thompson,	North Eastern, Starrucca Rural.	Harrisburg.
Herrick:					
Frank E. Entrot,	Uniondale No. 3,	C. P. Ross,	Burnwood,		Harrisburg.
Jackson:					
C. G. Corse,	Susquehanna No. 1,				Harrisburg.
Lanesboro Borough:					
F. A. Buckley,	Lanesboro,				Harrisburg.
Lathrop:					
J. R. Williams,	Hop Bottom No. 1,	H. D. Saunders,	Brooklyn,	Commonwealth,	Harrisburg.
Lenox:					
C. L. Decker,	Nicholson No. 3,				Harrisburg.
Little Meadows Borough:					
J. M. Russell,	Little Meadows,				Harrisburg.
Middletown Borough:					
David J. Jones,	Friendsille No. 2,	David J. Jones,	LeRaysville (Bell),	Peoples Consolidated,	Harrisburg.
Montrose Borough:					
C. D. Beck,	Montrose,				Harrisburg.
New Milford:					
B. C. Tourje,	New Milford,	B. C. Tourje,	New Milford,	North Eastern,	Harrisburg.
Oakland Borough:					
F. L. Van Antwerp,	Susquehana,	Exchange,	Oakland,	Local or Bell,	Harrisburg.
Springville:					
A. B. Tuttle,	Springville,			Both Phones,	Harrisburg.
Susquehanna Borough:					
David C. Mason,	Susquehanna,				Harrisburg.
Thompson:					
R. Gillett,	Thompson,	R. Gillett,	Thompson or Jackson,	North Eastern,	Harrisburg.
Thompson Borough:					
S. L. French,	Thompson,				Harrisburg.
Uniondale Borough:					
W. I. Morgan,	Uniondale,				Harrisburg.

TIOGA COUNTY.

Bloss.					
629 Frank Dahlgren,	Arnot,	F. Dahlgren,	Farmers,	Blossburg Coal Co.,	T. C. Harbeson.
Blossburg Borough:					
591 David Estep,	Blossburg,	D. Estep,	Covington,	Mutual,	T. C. Harbeson.
Brookfield:					
364 W. Reid Murdock,	Knoxville,	W. R. Murdock,	Knoxville,	Gilbrook,	T. C. Harbeson.
Charlestown:					
628 B. F. Edwards,	Wellsboro,	59-A,		Mutual,	P. H. Mulford.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

TIOGA COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Chatham:					
327 Everett J. Cooper,	Little Marsh,	E. J. Cooper,	Little Marsh,	Gilbrook Farmers,	T. C. Harbeson.
Clymer:					
356 Frank C. Payne,	Westfield No. 4,	Ed. Thompson,	Westfield,	Farmers,	T. C. Harbeson.
789 Howard L. Payne,	Little Marsh,	Joe Short,	Westfield,	Farmers,	T. C. Harbeson.
Covington:					
584 M. V. Jackson,	Covington,	11-I,	Mansfield,	Mutual,	T. C. Harbeson.
Deerfield:					
328 C. S. Merrick,	Knoxville,	4,	Knoxville,	Bell,	T. C. Harbeson.
H. S. Burns,	Academy Corners,				T. C. Harbeson.
Delmar:					
151 Jerome J. Wheeler (R.),	Wellsboro,	H. D. Wheeler,	N. Y. C. & H. R. R.,	Both 'phones,	T. C. Harbeson.
381 Ralph Torpy,	Wellsboro No. 2,	R. Torpy,	Stony Fork,	Farmers,	T. C. Harbeson.
330 E. J. Tuttle,	Wellsboro No. 1,	94-C,	Wellsboro,	Mutual,	T. C. Harbeson.
329 Noyes Lawton,	Tiadaghton,	12-5,	Wellsboro,	Bell,	T. C. Harbeson.
Duncan:					
523 Frank E. Howe,	Antrim,	Exchange,	Antrim,	Bell,	T. C. Harbeson.
Elk:					
128 Robert Schwab (R.),	Lloyd,	R. Schwab,	Germania,	Bell,	T. C. Harbeson.
387 A. E. Smith,	Gaines No. 1,	A. E. Smith,	Watrous,	Bell,	T. C. Harbeson.
486 Wm. Brecher,	Gaines No. 1,	John Baily,		Elk Run,	T. C. Harbeson.
622 Chas. Scanlin,	Leetonia,	Central Pa. Lbr. Co.,	Leetonia,	Bell,	T. C. Harbeson.
Farmington:					
599 A. Lee Kemp,	Nelson,	19-M,	Nelson,	Mutual,	T. C. Harbeson.
Gaines:					
104 Leon F. Lewis (R.),	Gaines,	4-K,	Watrous,	Elk Run,	P. H. Mulford.
590 L. M. Smith,	Gaines,	1-L,	Watrous,	Elk Run,	P. H. Mulford.
Hamilton:					
580 G. H. Higland,	Morris Run,	2-H,		Farmers,	T. C. Harbeson.
Jackson:					
568 Edwin E. Dailey,	Millerton,	E. E. Dailey,	Bell or Mutual,	Farmers,	T. C. Harbeson.
Lawrence:					
904 Elijah Callahan,	Tioga No. 2,	E. Callahan,	Lawrenceville,	Farmers,	T. C. Harbeson.
Liberty:					
576 Isaac R. Werline,	Liberty,	Exchange,	Liberty,	Both 'phones,	T. C. Harbeson.
Middlebury:					
558 Frank Davis, Jr.,	Middlebury Center,	12-C,	Middlebury,	Mutual,	T. C. Harbeson.

Morris:					
67 Thos C. Harbeson (F.),	Lloyd,	T. C. Harbeson.	Morris,	Farmers' Mutual,	Harrisburg.
86 M. Leo Fish (R.),	Lloyd,	Blackwell's Store,	Morris,	Bell.	
331 H. I. Fick,	Morris,	Blackwell's Store,	Morris,	Bell,	T. C. Harbeson.
553 R. S. Brown,	Morris,	H. I. Fick,	Liberty,	Mutual,	T. C. Harbeson.
560 Robert P. Heyler,	Morris,	R. S. Brown,	Morris,	Mutual,	T. C. Harbeson.
575 Herman Campbell,	Lloyd,	R. P. Heyler,	Morris,	Bell,	T. C. Harbeson.
		A. H. & R. J. Blackwell.		Bell,	T. C. Harbeson.
574 Jas. I. Beagle,	Morris,	Exchange,	Morris,	Farmers,	T. C. Harbeson.
Osceola Borough:					
796 D. M. Brown,	Elkland,				T. C. Harbeson.
Richmond:					
Nathan Niles,	Mansfield No. 2,				P. H. Mulford.
Rutland:					
565 W. B. Niles,	Mansfield,	4-M,	Rutland,	Mutual,	T. C. Harbeson.
Shippen:					
41 Paul H. Mulford (F.),	Asaph,	89-13,	Wellsboro,	Bell,	Harrisburg.
96 E. N. Jenckes (R.),	Asaph,	89-3,	Wellsboro,	Bell,	P. H. Mulford.
467 O. E. Peters,	Wellsboro No. 4,	100-I,		Farmers,	P. H. Mulford.
Sullivan:					
592 Elmer E. Updyke,	Mainesburg,	E. E. Updyke,	Sylvania,	Mutual,	T. C. Harbeson.
Tioga:					
545 William Kimball,	Tioga,	W. Kimball,	Tioga,	Farmers,	T. C. Harbeson.
Ward:					
577 Daniel Austin,	Morris Run,	Exchange,	Morris Run,	Both 'phones,	T. C. Harbeson.
Westfield:					
389 Harry G. Miller,	Potterbrook,	H. G. Miller,	Westfield,	Gilbrook,	T. C. Harbeson.

UNION COUNTY.

Buffalo:					
275 Harry S. Frock,	Lewisburg,	196-4,	Lewisburg,	Buffalo Valley,	A. C. Silvius.
East Buffalo:					
394 A. C. Machamer,	Lewisburg,	F. D. Reigle,		Both 'phones,	A. C. Silvius.
Gregg:					
Robert Brown,	Allenwood,				C. E. Baer.
Hartley:					
34 A. C. Silvius (F.),	Laurelton,	7-8,	Mifflinburg,	Bell,	Harrisburg.
305 David Libby (R.),	Weikert,				C. R. Meek.
298 W. H. Libby,	Millmont,				A. C. Silvius.
410 John C. Ruhl,	Hartleton,	9-7,	Mifflinburg,	Bell,	A. C. Silvius.
734 S. E. Osenbaugh,	Millmont No. 2,	H. J. Close,	Mifflinburg,	Bell,	A. C. Silvius.
768 Jas. M. Hironimus,	Weikert,				C. R. Meek.
Kelly:					
276 O. C. Eisenhauer,	Lewisburg,	251-7,	Lewisburg,	Bell,	R. B. Winter.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

UNION COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Lewis:					
148 J. W. Welshans (R.),	Loganton No. 1,				H. S. Metzger.
243 J. W. Zimmerman,	Loganton,	621-F-2,	Loganton,	Commercial,	H. S. Metzger.
242 J. C. Snyder,	Millmont,	62-8,	D. H. Klingman,	Bell,	A. C. Silvius.
277 H. J. Walburn,	Millmont,	628,	Mifflinburg,	Bell,	A. C. Silvius.
Limestone:					
246 J. F. Brouse,	Mifflinburg,	616,	Mifflinburg,		A. C. Silvius.
313 F. P. Dauberman,	New Berlin,	71-R-2,		Bell,	A. C. Silvius.
West Buffalo:					
62 Raymond B. Winter (F.),	Mifflinburg,	22-2,	Mifflinburg,	Buffalo Valley,	Harrisburg.
125 Stephen M. Roadarmel (R.),	Mifflinburg,	22-2 and 100-9,	Mifflinburg,	Buffalo Valley,	R. B. Winter.
White Deer:					
89 D. R. Harbeson (R.),	White Deer,	D. R. Harbeson,	Watsontown,	Bell,	H. S. Metzger.
521 Jim Depo,	West Milton,	Chas. Reist,	Lewisburg,		R. B. Winter.

VENANGO COUNTY.

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to.
Canal:					
O. C. Sigworth,	Franklin,				Harrisburg.
Cranberry:					
Burley Hogue,	Tenmile Bottom,				Harrisburg.
Clinton:					
Samuel Landis,	Kennerdell,				Harrisburg.
Cornplanter:					
C. G. Arrowsmith,	Oil City No. 2,				Harrisburg.
Irwin:					
J. L. Hileman,	Harrisville No. 64,				Harrisburg.
Jackson:					
J. B. Shoffstall,	Cooperstown,				Harrisburg.
Mineral:					
L. F. Perrine,	Raymilton,				Harrisburg.
Oakland:					
D. W. Prichard,	Franklin No. 3,				Harrisburg.
Plum:					
William Shadle,	Diamond,	Wm. Shadle,	Titusville,	Pet,	Harrisburg.
W. R. Welsh,	Cooperstown,				Harrisburg.

Richland:					
Joseph M. Nickle,	Nickleville,				Harrisburg.
Rockland:					
J. L. Taylor,	Kennerdell No. 1,				Harrisburg.
John Hart,	Kennerdell No. 1,				Harrisburg.
G. W. Bushey,	East Sandy No. 1,				Harrisburg.
Sandycreek:					
Jonathan Grinder,	Franklin,				Harrisburg.
Scrubgrass:					
E. A. Latshaw,	Kennerdell No. 2,				Harrisburg.

WARREN COUNTY.

Brokenstraw:					
W. M. Vollentine,	Irvine,	1509-R-5,	Warren,	Bell,	Harrisburg.
E. N. Babcock,	Youngsville,				Harrisburg.
Thomas Mariner,	Youngsville,	Thos. Mariner,	Youngsville,	Union,	Harrisburg.
Cherry Grove:					
E. M. Farnsworth,	Cherry Grove,	E. M. Farnsworth,		Bell,	Harrisburg.
Columbus:					
E. G. Carrier,	Corry No. 8,				Harrisburg.
Columbus Borough:					
Archie J. Damon,	Columbus,				Harrisburg.
Corydon:					
O. J. Tome,	Corydon,				Harrisburg.
Deerfield:					
James L. Sutton,	Torpedo No. 1,	Exchange,	Torpedo,	Bell,	Harrisburg.
Freehold:					
L. S. Chapman,	Bear Lake,				Harrisburg.
Glade:					
Arthur Winchester,	Warren No. 1,	1501-R-41,	Warren,	Bell,	Harrisburg.
Grand Valley Borough:					
R. E. Vaughn,	Grand Valley,				Harrisburg.
Kinzua:					
Walter H. Newton,	Kinzua,				Harrisburg.
Limestone:					
W. C. Averill,	Tidioute,				Harrisburg.
Pleasant:					
Peter Liberty,	Warren,				Harrisburg.
Sheffield:					
Richard Bloss,	Sheffield,				Harrisburg.
Spring Creek:					
Clayton E. Stearns,	Spring Creek,	39-K,	Corry,	Union,	Harrisburg.
Sugar Grove Borough:					
James Brookmire,	Sugar Grove,				Harrisburg.
Tidioute Borough:					
P. A. Anderson,	Tidioute,				Harrisburg.
Triumph:					
Charles T. Strite,	Grand Valley No. 2,	Warren Sanson,	Grand Valley,	Union,	Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

WARREN COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Warren Borough:					
Gilbert A. Denniston,	Warren,				Harrisburg.
Watson:					
C. W. Arp,	Warren No.				Harrisburg.

WAYNE COUNTY.

Township, Name, Number.	Address.	Call.	Exchange.	Company.	Reports to.
Berlin:					
Alexander Crosby,	Beech Lake.	W. H. Dunn, 5-4.		Bell,	Harrisburg.
Bethany Borough:					
Charles W. Wood,	Bethany.		Bethany,	Bell,	Harrisburg.
Buckingham:					
John Muranie,	Starlight.	J. T. Muranie.	Shehockton or Lake Como.	Bell,	Harrisburg.
E. W. Chapman,	Equinunk.				Harrisburg.
James Spratt,	Lake Como.				Harrisburg.
Canaan:					
Fred W. Short,	Waymart No [illegible]	810,	Waymart,	Consolidated,	Harrisburg.
Cherry Ridge:					
384 G. W. Collins,	Hoadleys.	921-4,	Honesdale.	Bell,	Strobeck.
Clinton:					
I. W. Cowperthwaite,	Waymart No [illegible].	I. W. Cowperthwaite	Forest City,	North Eastern,	Harrisburg.
Damascus:					
Junius Young,	Milanville.				Harrisburg.
Dreher:					
527 E. D. Dunning,	South Sterling,	4-8,	Newfoundland,	Bell,	Strobeck.
J. B. Kranter,	Newfoundland,		Newfoundland,	Bell,	Harrisburg.
Hawley Borough:					
908 Edgar Tuthill,	Hawley,	33-J,	Hawley,	Bell,	Harrisburg.
Lake:					
411 Earl W. Swingle,	Varden,	22-D,	Ariel,	Paupack,	Strobeck.
Lebanon:					
C. D. Henderson,	Honesdale No. 3.	Rutledge Store,	Rileyville,		Harrisburg.
Lehigh:					
383 John Courtney,	Gouldsboro,		Gouldsboro,	Bell,	Strobeck.

Manchester:					
J. W. Harford,	Equinunk,	Exchange,	Equinunk,	South Branch,	Harrisburg.
Mount Pleasant:					
H. W. Mills,	Pleasant Mount No. 2,				Harrisburg.
Oregon'					
Henry Grossman,	Honesdale No. 3,	904-14,	Honesdale,	Bell,	Harrisburg.
Palmyra:					
Anthony Schlosser,	Hawley No. 1,	Geo. Kehr, 5-8-4,	Hawley,	Swamp Brook,	Harrisburg.
Paupack:					
382 Charles A. Daniels,	Lakeville,	15-N,	Lake Ariel,	Paupack,	Strobeck.
Lafayette James,	Lakeville,				Harrisburg.
Preston:					
J. L. Sherwood, Jr.,	Preston,				Harrisburg.
Prompton Borough:					
S. E. Bates,	Prompton,				Harrisburg.
Salem:					
385 A. B. Walker,	Hamlin,	15-A,	Hamlin,	Bell,	Strobeck.
South Canaan:					
A. I. Robinson,	Waymart No. 2,	2-12,	South Canaan,	South Canaan,	Harrisburg.
Henry Brundage,	Gravity,				Harrisburg.
Starrucca Borough:					
George F. Brooker,	Starrucca,				Harrisburg.
Sterling:					
I. S. Simons,	Madisonville,	J. G. Simons,	Madisonville,	Moscow & Sterling,	Harrisburg.
Waymart Borough:					
Joseph C. Denk,	Waymart,	J. B. Dymond,		Bell,	Harrisburg.

WESTMORELAND COUNTY.

Cook:					
620 I. A. Knupp,	Kregar,	J. W. Phillippi,	Stahlstown,		V. M. Bearer.
490 W. H. Enos,	Crisp,	W. T. Weaver,			V. M. Bearer.
491 L. A. Ankney,	Crisp,	W. T. Weaver,		Ligonier Valley,	V. M. Bearer.
542 N. J. Monticue,	Stahlstown,		Stahlstown,	Ligonier Valley,	V. M. Bearer.
638 Elmer Campbell,	Ligonier No. 3,	12-R-20,	Stahlstown,	S. W. & C.,	V. M. Bearer.
Derry:					
605 John Schwalm,	Millwood,	51-R-5,	Derry,	Bell,	V. M. Bearer.
492 L. C. Shanefelter,	New Alexandria, No. 1.	17-R-11,	New Alexandria,	Bell,	V. M. Bearer.
Donegal:					
601 Mahlon H. Lenhart,	Donegal,	9-R-23,	Latrobe (Bell),	Ligonier Valley,	V. M. Bearer.
600 William Roadman,	Kregar,	Wm. Roadman,	Ligonier,	Ligonier Valley,	V. M. Bearer.
Fairfield:					
612 Bert Reed,	New Florence,	S. T. Ford,	Johnstown or Bolivar,	Bell,	V. M. Bearer.
493 G. E. McDowell,	Bolivar,	5-R-23,	Hamil School,	Bell,	V. M. Bearer.
494 John Frain,	Bolivar,		Bolivar,	Bell,	V. M. Bearer.
Hempfield:					
717 David H. Rankin,	Penns Station,	167-J, 200-J,	Jeannette,	Bell,	V. M. Bearer.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

WESTMORELAND COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Ligonier Borough:					
6 V. M. Bearer (F.),	Ligonier,	77-J,	Ligonier,	Central District,	Harrisburg.
Ligonier:					
495 W. W. Wallace,	Rector,	186-R-21,	Ligonier,	Central District,	V. M. Bearer.
496 H. H. Wolford,	Ligonier No. 2,	Kissels Springs,	Ligonier,		V. M. Bearer.
497 John W. Darr,	Laughlinstown,	52-R-4,	Ligonier,	Bell,	V. M. Bearer.
498 Peter Will,	Ligonier,		Pump Station,	C. D. & P.,	V. M. Bearer.
Mt. Pleasant Borough:					
610 Edward Swartz,	Mt. Pleasant,	153-J, 150,		Bell, Tri State.	V. M. Bearer.
Mt. Pleasant:					
611 E. C. Myers,	Mt. Pleasant,	136-J, 133,		Bell, Tri State.	V. M. Bearer.
613 A. L. Myers,	Mt. Pleasant,	R. Doncaster,		Both 'phones,	V. M. Bearer.
New Kensington Borough:					
756 W. C. Gray,	New Kensington,	Steiner Bros.,		Bell,	V. M. Bearer.
Penn Borough:					
David H. Rankin,	Penns Station,				V. M. Bearer.
Rostraver:					
770 S. C. Shepler,	Belle Vernon,	W. E. Crawford,	Belle Vernon,	W. & F.,	V. M. Bearer.
Salem:					
755 Jos. W. Steel,	Greensburg No. 4,	1334-R-14,	Greensburg,	Bell,	V. M. Bearer.
South Huntingdon:					
716 Walter S. Bell,	West Newton No. 1,	14,	Irwin,	Bell,	V. M. Bearer.
St. Clair:					
621 J. L. Hedges,	Seward,	Big Springs Hotel,	Big Springs,	Bell,	V. M. Bearer.
606 W. H. Porter,	New Florence,	52-R-2,	Bolivar,	Bell,	V. M. Bearer.
Suterville Borough:					
833 George Messner,	Suterville,	183-R-14,	West Newton,	Bell,	V. M. Bearer.
West Newton Borough:					
749 B. R. Peters,	West Newton,	50-R,	West Newton,	Bell,	V. M. Bearer.
Youngstown Borough:					
602 R. N. Johnston,	Youngstown,	92-R,			V. M. Bearer.

WYOMING COUNTY.

Braintrim:					
Fred L. Hoadleys,	*Skinners Eddy*,				Harrisburg.
Eaton:					
F. M. Hadsall,	Tunkhannock,				Harrisburg.
Factoryville Borough:					
Frank Gardner,	Factoryville,				Harrisburg.
Falls:					
Jonathan Swartwood,	Falls,				Harrisburg.
Peter H. Lasher,	Ransom No. 1,				Harrisburg.
Forkston:					
Oscar R. Harding,	Mehoopany,	3-4-F,	Mehoopany,	Commonwealth,	Harrisburg.
F. O. Burgess,	Mehoopany No. 1,	E. E. Harding, 3-4-F,		Commonwealth,	Harrisburg.
William H. Shaffer,	Ricketts,				Harrisburg.
Lemon:					
T. E. Watkins,	Tunkhannock No. 2,				Harrisburg.
Mehoopany:					
Ben C. Decker,	Tunkhannock No. 3,	16-3,	Mehoopany,	Bell,	Harrisburg.
Meshoppen Borough:					
Judson E. Vosburg,	Meshoppen,				Harrisburg.
Meshoppen:					
Burt F. Winnie,	Vosburg No. 1,	Exchange,	Meshoppen,		Harrisburg.
Monroe:					
Harry T. May,	Tunkhannock No. 5,	Wilber Lutes, 23-17,		Bell,	Harrisburg.
Nicholson Borough:					
Stephen S. Jenkins,	Nicholson,				Harrisburg.
Nicholson:					
Fred Cobb,	Nicholson,				Harrisburg.
North Branch:					
Thomas Collins,	Lovelton,				Harrisburg.
Noxen:					
G. W. Schenck,	Noxen R. D.,		Noxen,	Bell,	Harrisburg.
Frank C. Turner,	Noxen,	B. J. Camel,		Bell,	Harrisburg.
Overfield:					
S. E. Gregory,	Lake Winola,	109,	Factoryville,	Bell,	Harrisburg.
Tunkhannock:					
G. E. Welch,	Osterhout,				Harrisburg.
Washington:					
G. H. Davies,	Tunkhannock No. 1,				Harrisburg.
Windham:					
Andrew Stevens,	Graysville No. 5,	10-7,	Mehoopany,	Bell,	Harrisburg.

YORK COUNTY.

Carroll:					
George W. Kinter,	Dillsburg No. 1,	S-50-W,	Dillsburg,	United York,	Harrisburg.
Chanceford:					
L. D. Fry,	Redlion No. 1,		York,	Bell or Eastern,	Harrisburg.

ROSTER OF FOREST FIRE WARDENS OF PENNSYLVANIA—Continued.

YORK COUNTY—Continued.

Township, Name, Number.	Address.	Telephone Through Which Warden Can Be Reached.			Reports to.
		Call.	Exchange.	Company.	
Conewago:					
E. A. Bear,	York No. 8,	Bear Bros. Cigar Factory.	Zions View,		Harrisburg.
Cross Roads Borough:					
Henry Hershner,	Felton No. 2,				Harrisburg.
Dallastown Borough:					
J. T. Grim,	Dallastown.				Harrisburg.
Dillsburg Borough:					
C. K. Weaver,	Dillsburg,	S-245,	Dillsburg,	York,	Harrisburg.
East Hopewell:					
J. C. Torbert,	Laurel,				Harrisburg.
East Manchester:					
Wm. M. Hoover,	Saginaw,				Harrisburg.
Fawn:					
Isaac Reed,	Muddy Creek Forks,				Harrisburg.
Fawn Grove Borough:					
J. W. Brooks,	Fawn Grove,	L. E. Devilbiss,	Fawn Grove,	York Eastern,	Harrisburg.
Franklin:					
Henry C. Sheaffer,	Dillsburg No. 1,	85-4,	Dillsburg,	Bell,	Harrisburg.
Glen Rock Borough:					
W. T. Snyder,	Glen Rock,				Harrisburg.
Jackson:					
H. L. Yohe,	Spring Grove,	E. D. Stambaugh,	Spring Grove,	York,	Harrisburg.
Lower Chanceford:					
George Sinclair,	Woodbine No. 1,	Geo. Sinclair,	Airville,	Bell,	Harrisburg.
Lower Windsor:					
John H. Fry,	Wrightsville No. 1,	Howard C. Fry,		York,	Harrisburg.
Manchester:					
Henry Altland,	York No. 8,				Harrisburg.
Monaghan:					
John A. Laird,	Siddonsburg,	27-2,	Mechanicsburg,	Bell,	Harrisburg.
Newberry:					
J. Frank Zortman,	Newberrytown,				Harrisburg.
North Codorus:					
L. W. Feistel,	York No. 11,	John Snyder, Y-265,		York,	Harrisburg.
North Hopewell:					
W. F. Newhouse,	Glen Rock No. 1,				Harrisburg.
North York:					
G. A. Fetrow,	948 Duke, York,				Harrisburg.

Peach Bottom:					
Joseph E. Wiley,	Delta No. 4,				Harrisburg.
Penn:					
A. L. Serff,	Hanover,				Harrisburg.
Redlion Borough:					
J. F. Strayer,	Red Lion,	293,	Red Lion,	York,	Harrisburg.
Seven Valley:					
Harry F. Groff,	Seven Valley,				Harrisburg.
Springfield:					
Frank J. Beck,	Jacobus,	T-22-13,	York,	Bell,	Harrisburg.
Spring Garden:					
E. Rouse,	York No. 2,	Geo. Shearer, 1097-M,	York,	York,	Harrisburg.
West Manheim:					
Lloyd G. Garrett,	Hanover,	612-Y-E,	Hanover,	Pleasant Hill,	Harrisburg.
Windsor:					
H. F. Shenberger,	Felton,				Harrisburg.
Winterstown Borough:					
Daniel F. Brenneman,	Springvale No. 1,	Snyder's Store, 7-R-3,	York,	Bell,	Harrisburg.

FOREST FIRE WARDENS OF THE HARRISBURG OFFICE.

GEORGE H. WIRT, Chief Forest Fire Warden.
1 HOWARD W. SIGGINS.
13 W. GARD CONKLIN.
27 JESSE M. HOUTZ.
34 N. R. McNAUGHTON.
43 WALTER M. MUMMA.
44 MAURICE MUSTIN.
49 HORACE B. ROWLAND.
55 EDGAR H. SMITH.
64 CHARLES E. WOOF

EXCHANGE
MAY 30 1917

A GUIDE TO THE EXHIBIT

OF THE

PENNSYLVANIA DEPARTMENT OF FORESTRY

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

AND

INFORMATION ABOUT THE WORK OF THE DEPARTMENT

Cabin on the Barree State Forest, Huntingdon County. A Good Type for Permanent Camp Sites.

ISSUED BY DIRECTION OF THE COMMISSIONER OF FORESTRY
BULLETIN 14. SEPTEMBER, 1916

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER.
1916.

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BULLETIN 14. SEPTEMBER, 1916

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER.
1916

EXHIBIT OF THE PENNSYLVANIA DEPARTMENT OF FORESTRY.

Below is given a guide to the exhibit of the Department, and a short description of articles on exhibition.

Men of the Pennsylvania Forest Service will be in constant charge, and are here to answer questions about the exhibit or the work of the Department.

A. WOOD SPECIMENS.

The wood specimens mounted in the green cases are taken from trees which are native to Pennsylvania. Most of them were taken from trees cut on the Pennsylvania State Forests. The wood has not been finished or treated in any way except that it has been roughly polished with sand paper.

The printed cards in the boxes give the common and botanical names of the trees from which the specimens were taken. The two names are given because many trees have more than one common name, and the scientific name makes it simpler to identify them.

The circular specimens are cross sections, cut at right angles to the stem of the tree. Wood used for paving blocks is often cut in this way. The rings, which are very noticeable in most of the specimens, are caused by the difference in density between the wood grown in the spring, and that grown in the summer. Each ring marks a year's growth, and the age of the tree at the point where the specimen was taken out is the same as the number of rings on the specimen.

The two board-like specimens displayed with the cross sections are tangential and radial sections. The radial section is made by cutting from the circumference to the center of the tree. Quartered oak is the best example of radial cutting. The tangential sections are made by cutting at right angles to a line passing from center to circumference of the tree. The greater part of the lumber in common use is cut in tangential section.

B. PHOTOGRAPH CASES.

The pictures in the large photograph cases were almost all taken on or near Pennsylvania State Forests. The cases are numbered from 1 to 5, and, so far as possible, the photographs are arranged in series. Starting at case 1, and following through the series to case 5, you will follow roughly the history of Pennsylvania's forests.

First come the virgin stands of huge pines, hemlock and hardwoods, the forests which made Pennsylvania at one time the first timber producing State of the Union, and which led careless people to think that our timber supply was inexhaustible. Notice especially the heavy canopy, and the thick carpet of leaves on the forest floor. These are Nature's provisions for keeping a check on the rise and fall of our streams. The litter on the ground acts both as a reservoir and a filter, and, except for direct precipitation, is the largest single factor influencing floods and water famines.

The lumberman was the chief actor in the second chapter of the story of the forest. Many call him the chief villain, but mistakenly. Pennsylvania's magnificent timber was needed to build houses and barns, ships and railroads, and it was one of the principal reasons for the rapid development of our State after the colonial days. The only just charge that can be placed at the door of the lumberman is that he was wasteful of a commodity which seemed to be unlimited in quantity and unsurpassed in quality. Lumbering machinery was not perfected, prices were low, and the distance to market was great. So it is not surprising that only the best part of the tree was used, and the remainder,—frequently the larger part of the tree,—was left to rot in the woods.

Usually this tangled debris did not have time to rot. Some thoughtless person dropped a lighted match, or some careless camper forgot his fire, and in the dry springs and autumns conflagrations started which often burned over whole townships. These fires destroyed not only the litter which the lumberman left to rot, but the green trees which were too small to cut, and which were the only hope for a natural reproduction of the forest. They burned the leaves and humus on the ground, so that the water no longer seeped into the streams gradually, but ran off the hills in torrents. It is safe to say that more game has been destroyed and driven away by forest fires than has ever been seen by hunters.

After the forest fire had followed the lumberman, the transformation of the primitive forest to a barren waste was complete. Weeds, ferns, bracken, scrub oak, and worthless tree species took the place of the pines and hemlock of other years. Pennsylvania dropped from the first timber producing State of the Union to the twentieth. Floods came in the wet seasons. Water was scarce in periods of slight rainfall. Our streams were no longer constant in flow, but subject to ups and downs with every change of weather.

Thoughtful people realized that something must be done. Private owners of forest land could not, for financial reasons, care for their land according to the conservative forestry methods practiced abroad. Low prices and high taxes put private forestry out of the question. The only solution was State ownership and State forestry. A conservation campaign was waged for over fifteen years before the people were awakened to the necessity for action. The Department of Forestry was finally created, with Dr. J. T. Rothrock as the first Commissioner, for the purpose of purchasing forest land for the State, subduing forest fires, and finally restocking the barren land with trees so that it might some day be brought back to its former condition. This is the concluding chapter in the story of the forest, but some day we should be able to write an epilogue which shall tell of the reconstruction of the forests which have been so largely responsible for our very existence as a great Commonwealth.

C. SEED JARS.

In the glass jars scattered among the other exhibits are shown seeds of some of Pennsylvania's native forest trees. The labeling is the same as in the wood specimen cases, both common and scientific names being given. These seeds were all collected in Pennsylvania. From seeds like these the Department of Forestry is raising and planting 6,000,000 trees a year.

This year experiments are being started with the Russian mulberry, and other fruit-bearing trees, with the idea of producing trees which will be of value for their timber, and at the same time help feed the birds. Among the trees which produce bird food in abundance are the paw paw, mountain ash, sassafras, black cherry, Spanish yellow cherry, June-berry, dogwood, and hackberry. The wild grape vine and the mountain ash both hold their fruit so that birds can feed on it during the winter months.

D. LEAF MOUNTS.

These are the green leaves under glass suspended on the walls of the booth. They are not mounted leaves, but wax models of leaves. They have the exact size, shape, and veining of the original leaves.

A good dendrologist should be able to identify most of Pennsylvania's trees by their leaves alone. Each leaf has characteristics of its own. Note especially the difference between the white oak and red oak leaves.

E. FOREST TOOLS.

1. Double bitted axe.
2. Mattock, used for planting trees.
3. Mallet, used to firm ground around planted trees.
4. Fire torch, used for backfiring. Burns kerosene or lard oil.
5. Sprouting axe, used for removing sprouts from stumps which it is desired to kill.
6. Fire rake, used in making path for backfiring.
7. Calipers, used for measuring diameter of trees.
8. Small hand axe.

F. ILLUMINATED LANTERN SLIDES.

These are arranged in the same way as the photograph cases, starting with the slides showing virgin forests, and ending with the slides showing the work being carried on by the Department. The title of each slide is given in the brass clip below it.

G. MAPS AND CHARTS.

1. Large map of Pennsylvania, showing State Forests, forest nurseries, district foresters' locations, etc.
2. A topographic map of a State Forest, showing roads, trails, fire lanes, boundary lines, streams, etc. This is the detail map from which the forester makes his working plans.
3. A warrantee map of a part of a State Forest, showing boundary lines, survey marks, area, date of acquisition, and original survey. These maps are made by the Division of Surveys of the Department of Forestry for the guidance of foresters in establishing on the ground the boundary lines of their forests.
4. A map showing the present status of the chestnut blight in Pennsylvania, so far as it could be determined from the reports made by foresters. The solid black circles show places where the blight is spreading; the half black circles show where it is stationary; the open circles show where it is not present, or no report was made. Contrary to general public opinion, the blight is advancing rapidly almost all over the State.
5. Maps of Pennsylvania showing graphically.
    a. The total area of the State.
    b. The area of forest land in the State.
    c. The area of State Forests.
    d. The area which should be State Forest.
    e. The area burned over each year.
    f. The total area kept unproductive by forest fires.

The areas are drawn in to scale. Notice the relation of the present area of State Forests to the area which should be State Forests.

6. A sketch showing the relation of the damage done by forest fires to the amount appropriated for extinction and prevention of fires.
7. Map of a State Forest of special interest to sportsmen. This map shows roads, fire lanes, trails, Forest headquarters, streams, camp sites, etc. It is issued by the Department, and sold to hunters at a nominal price. These maps are not yet available for all the Forests, but will be made up and placed on sale as rapidly as possible.

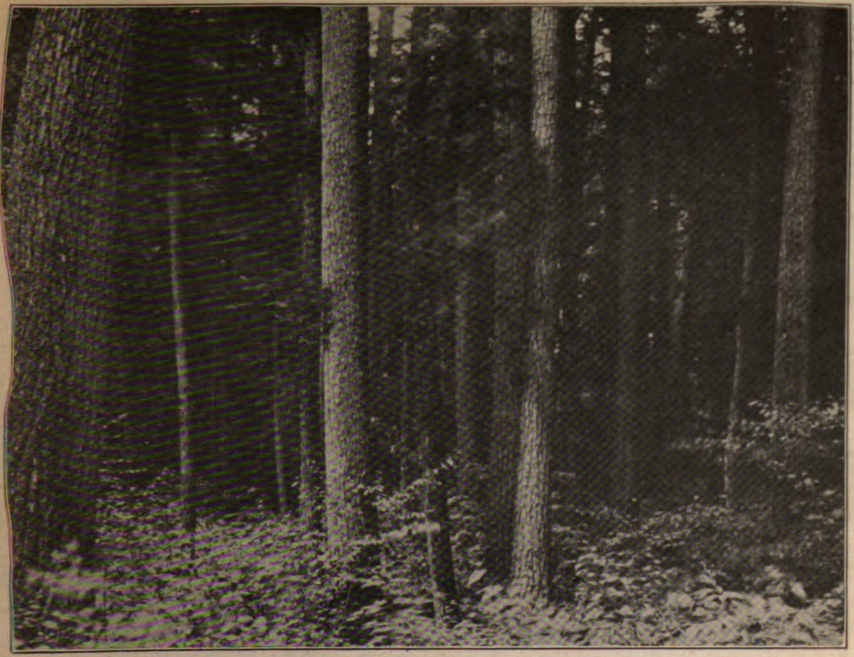

Fig. 1. Not many years ago Pennsylvania had millions of acres like this.

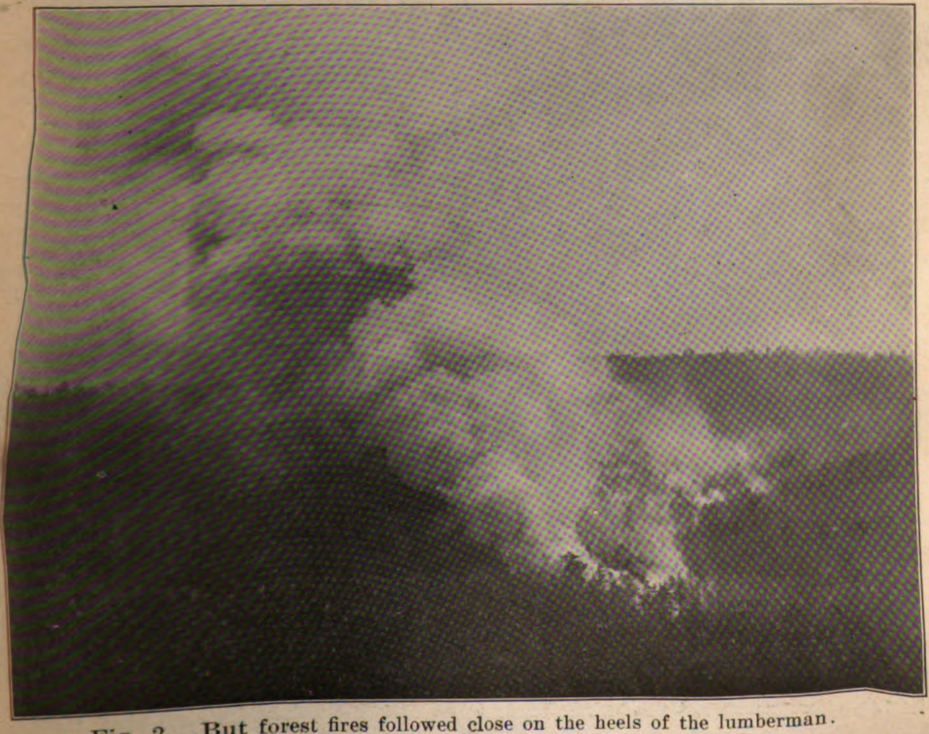

Fig. 2. But forest fires followed close on the heels of the lumberman.

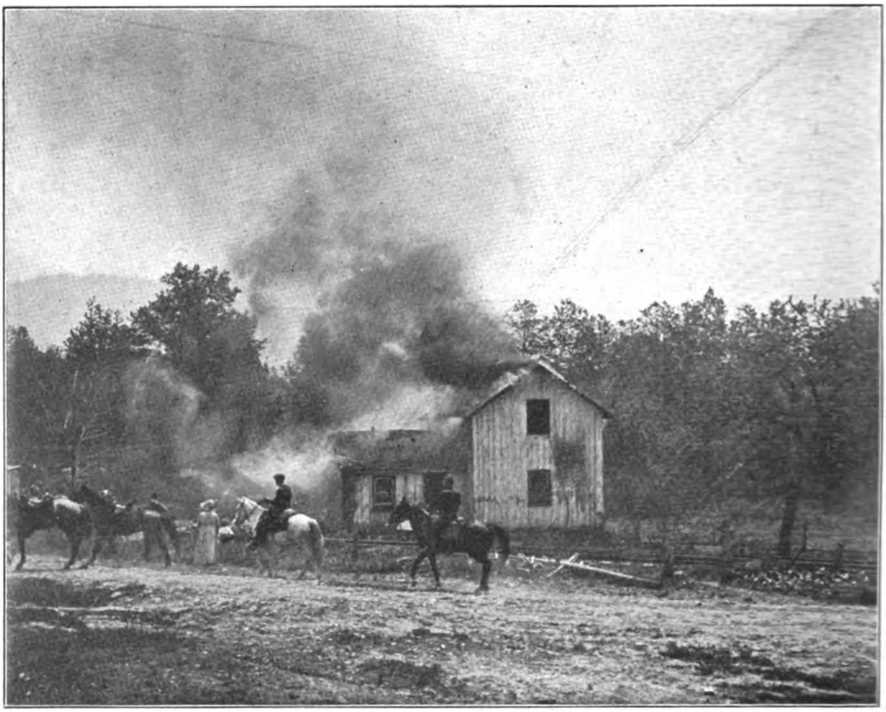

Fig. 3. And the fires destroyed not only the forest, but the homes and even the lives of the forest dwellers.

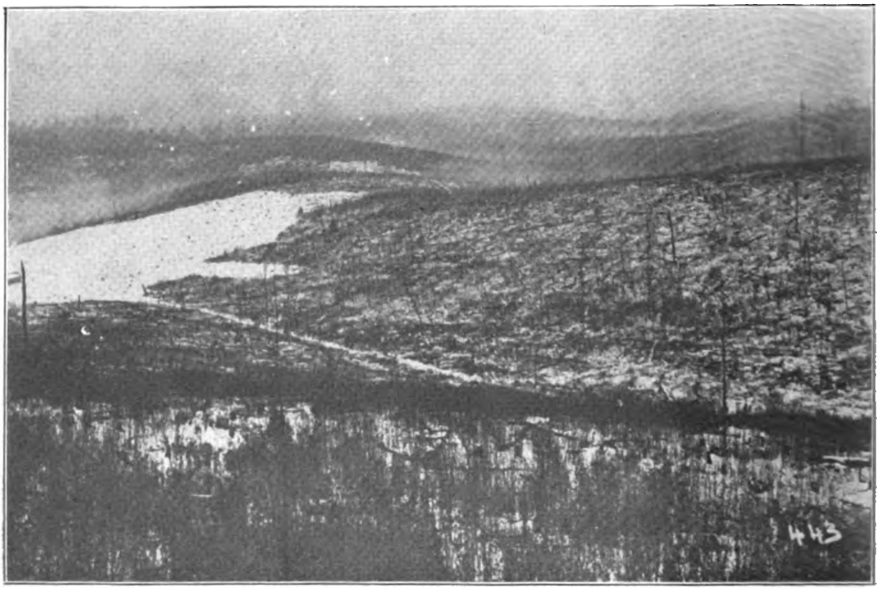

Fig. 4. And now Pennsylvania has 5,000,000 acres like this!

H. SEEDLINGS.

The small trees is the brown paper pots will be given away free to those who ask for them, provided they promise to plant and care for them. The ones with the stiff, light green needles are Norway spruces. The ones with the gray-green, flexible needles are white pines.

These trees are two years old. They are raised from seed by the Department of Forestry in the State Forest nurseries. 13,000,000 are now in stock in the 26 nurseries. When they reach this size they are planted on the State Forests at the rate of about 6,000,000 a year, for the purpose of reforesting our barren and burned over mountains. (See articles elsewhere in this pamphlet for directions for planting the tree you receive here, and for conditions under which you may secure larger quantities for forest planting).

DIRECTIONS FOR PLANTING THE SMALL TREES WHICH ARE DISTRIBUTED AT THIS EXHIBIT.

1. Your care of the tree should start when you receive it. Don't batter and bruise it on your way home, and still expect it to grow. Trees appreciate kindness just as much as animals.
2. These trees are potted in very shallow pots. As soon as you take them home you should transplant them to the place where you want them to grow finally.
3. This place should be in good soil, but unless the soil is unusally poor, you need not give the tree any fertilizer.
4. Dig the hole for the tree deep enough so that the roots will not need to be bent in planting.
5. When the hole is ready for the tree, don't jerk the tree out of the pot in which you receive it. One pull will tear off many little rootlets on which the tree depends for its life. Cut the pot away with a knife or scissors, and take out the tree with the ball of ground still attached.
6. Gently loosen and remove the ball of earth in which the tree is now planted. Straighten out the roots carefully, and set it in the hole you have dug. Be careful not to set the tree deeper than it was before. A little collar around the stem will show you how deep it stood in the ground in the nursery. Set it to the same depth.
7. Now pack the earth tightly around the tree. Use only soil for packing. Don't put in grass or other material which will decay and leave an open place. And pack the soil tightly.

8. The tree will not freeze. You may leave it outdoors all winter. The only time cold will hurt it is in the spring, when a late frost may nip the new growth.
9. These trees are conifers, and will not stand extreme shading. Keep down the grass, weeds, or other growth which may overtop them and shade them out.
10. Remember that you received the tree from the Pennsylvania Department of Forestry, and that the Department wants your help in conserving and replacing our forests for the use of Pennsylvania's people in the time to come.

THE CAMP AND THE CAMP FIRE.

With the increase in the number of those who camp on the State Forests, the proper care of camp fires is becoming of more and more importance in forest protection. In 1915 one hundred and thirty-six forest fires were directly traceable to the carelessness of hunters and campers, and the resulting damage was over $100,000. If these men had taken proper care of their camp fires, this damage would have been lessened and probably eliminated, and the campers would have had their reward in being more comfortable, and in being able to return to a camp site not rendered unrecognizable by fire.

To the seasoned camper, this article will be merely the rehashing of the A. B. C.'s of woodcraft, but it will be strictly news to many of the more recent additions to the outdoor army.

Where to Camp.

In choosing a camp site, there are only two prime requisites for the experienced woodsman,—wood and water. Given a good supply of these, your old hunter will undertake to pass a restful night almost anywhere. Look to these things first when you are in a strange woods. If you cannot get both together, choose water first in summer, and wood in fall and winter.

Three other points should be given due consideration:

(1) A site on a hilltop is exposed to the wind.

(2) Frost settles first and heaviest into the stream bottoms.

(3) As a rule, the best springs and fire wood are not found in the main creek bottoms, or "draws," as they are colloquially called, but in the smaller hollows which branch off from these main hollows. Hence the best camp site is usually neither on a hill nor along a creek, but between the two.

The Camp Fire.

Supposing that you have found a camp site which has the natural advantages in a combination to your liking, your first care is to start your fire and pitch your shelter,—the fire first, because it can be burning down to a bed of coals while you are driving tent pegs.

Mark it down as an established fact that no good woodsman builds a fire anywhere without taking precautions against its spreading. Get a forked stick, and scrape away all the leaves and other inflammable material for a distance of ten feet all around the place where the fire is to be, *and do this before you build the fire.*

Of course, you need some sort of a fire place. If you have a tool for digging, make a long, narrow trench in the ground, and bank up around the edges the earth you remove. Cover over a foot at the rear, and leave a small opening for a chimney, so that the smoke may be at least partly carried away. Keep your eye on the wind. and build the fire so that the smoke will be carried away from camp. If you have nothing with which to make a trench, build up a fire place with flat stones. If you can find no suitable stones, build your fire in the center of the piece of ground you have cleared of rubbish. Cut two stout forked sticks, and drive them, forks up, one on each side of the fire. Get another strong stick, and lay it across the forks. Now cut several smaller forks, the weaker side of the fork three or four inches long, and the stronger side from one to two feet long. Drive nails every two or three inches in the stronger fork, at a sharp upward angle, and hang the forks on the cross-stick by these nails. Hang your pot on the weak fork, and regulate the distance above the fire by hanging the fork by a higher or lower nail. If you have no nails, drive the heavy forked sticks a little deeper, and hang your kettle directly on the cross-stick.

For the actual building of the fire, you should have (1) a small amount of quick burning, easily ignited wood for kindling; (2) a larger amount of wood which will burn quickly to coals for cooking; and (3) a still larger amount of slow burning wood for heating. Following is a list of woods classified under these headings in the order of their excellence:

Kindling:
- Pitch pine knots, split.
- White pine.
- Thoroughly dry *inside* chestnut bark.
- Birch bark.

Cooking wood:
- Bark of dead hemlock, pine, hickory, or maple.
- Dry aspen.

Hickory.
Black birch.
Hardwood branches, not too large.

Heating wood:
Hickory.
White oak.
Hard maple.
Beech.

The last named woods, although they make excellent heating fires, should be watched after the fire is well started. They are "spitters," or "snappers," that is, they discharge glowing coals to a considerable distance, and if not watched may start a forest fire which will cover a township. Scrape the dead leaves and litter away for at least ten feet, and keep a watch in addition. Most of the light tents burn easily, and a glowing coal may destroy your shelter at a most inopportune time.

Breaking Camp.

Most camps are broken in the morning because distance to the settlement or railroad makes it advisable to take a whole day for moving. Transients almost invariably break camp in the morning.

Remember this:—The morning is a period of comparative calm and dampness. In these still hours your camp fire may seem dead and cold. Don't trust it! A wind, springing up later in the day, may fan hidden coals into a blaze and start a forest fire which will transform your camp site from a natural beauty spot to a charred and desolate reminder of your own carelessness.

As soon as breakfast is over, spread the coals out flat, and pour water over them. Don't be niggardly. Use all the water you think is needed, and then carry an extra bucketful. Now break camp, keeping an eye on the fire for signs of life. When your packing is done, turn over the coals, and put the extra bucketful of water on the fire, whether you think it is needed or not.

Finally, be moderate. Don't build a bonfire. What you want is a companionable blaze to sit or lie beside, not a huge conflagration which must be regarded with awe and approached with respect. Besides, you may want to come back to the same site next season, and you'll wish then that you had left some dry wood within a mile.

HOW SEEDLING TREES ARE DISTRIBUTED FREE OF CHARGE BY THE DEPARTMENT OF FORESTRY.

Below is given a copy of the act, passed at the last session of the Legislature, which authorizes this Department to distribute seedling trees from its nurseries.

AN ACT

Authorizing the Department of Forestry to grow and distribute young forest trees, and restricting their use after distribution.

Section 1. Be it enacted, etc., That the Department of Forestry is hereby authorized to grow young forest trees, and to distribute them to those desiring to plant them, in such quantity and under such regulations as may be prescribed by the department, when the available stock in the forest nurseries shall be in excess of that required by the department for forest planting. No charge shall be made for the trees so distributed, but the cost of boxing and shipping shall be paid by the applicant. The applicant must enter into an agreement with the department to plant the young trees under such conditions or regulations as may be made by the department, and to protect and care for them when planted. The department may render such assistance and instruction in the planting of trees as it may deem necessary to secure their proper planting.

Section 2. That all such young forest trees, which shall be distributed as aforesaid, shall not be subject to sale in the hands of the applicant, but shall be properly planted in accordance with the agreement entered into with the department.

Under the provisions of this act the Department distributed over a million trees in the spring of 1916. By a ruling of the Commission, trees were not distributed in lots of less than 500, and no trees were furnished except for strictly forest planting. Shade and ornamental trees cannot be supplied from the State Forest nurseries for the reason that trees are taken from the nurseries when only two years old (see trees at this exhibit), and are then altogether too small for anything but forest planting.

The trees were shipped by parcel post or express, and, where the number was not too great, were packed in pasteboard boxes. The charges for lifting, bunching, and packing averaged about ten cents per thousand. The charges for shipping varied from ten to twenty cents per thousand, depending on the species shipped and method of shipping.

It is impossible to tell how many trees will be available for free distribution in the spring of 1917. The number will be influenced by weather conditions, insect and fungus attacks, and funds available for planting on the State Forests,—all factors beyond the control of the Department.

PLANTING OF TREES TO FURNISH FOOD FOR BIRDS.

Under the heading "C," on page 5, will be found a partial list of the trees which are best adapted to furnish food for birds. For a number of years the Department of Forestry has been planting black cherry trees on the State Forests. This spring (1916) between 5,000 and 6,000 black cherry trees were distributed as widely as possible over the State, to be planted in places where food was needed for the birds. 3,000 of the trees were distributed in 200 lots to fifteen game wardens, and were planted by them in places where they could be cared for, and the birds allowed to feed on their fruit in safety.

Several hundred cuttings were made from a sweet mulberry growing on the property of Hon. I. C. Williams, Deputy Commissioner of Forestry. These cuttings have been distributed among the nurserymen of the Department, and will be set in the forest nurseries and allowed to multiply, so that in a few years a number will be available for distribution every year.

STATE FOREST PLANTING

SUMMARY BY YEARS

Number of seedlings planted, and area.

Year.	Number of Plantings Made.		Number of Seedlings Planted.		Area Treated. (Acres.)	
	New plantations.	Reenforcements.	In new plantations.	For reenforcements.	New plantations.	Reenforcements.
1899,	1	....	1,000	....	....	....
1900,	1	....	1,500	....	....	....
1902,	1	....	5,000	....	2.5	....
1903,	....	1	....	1,600	....	2.5
1904,	2	....	7,700	....	4.5	....
1905,	2	....	40,000	....	24.3	....
1906,	10	....	99,550	....	37.5	....
1907,	8	1	35,930	2,000	17.1	4.5
1908,	21	....	100,628	....	48.4	....
1909,	66	3	733,418	5,043	279.3	4.5
1910,	90	6	971,840	120,373	428.8	73.4
1911,	111	9	1,547,505	116,156	718.5	85.3
1912,	132	19	1,745,722	144,682	857.5	174.4
1913,	118	20	3,101,107	63,530	1,597.6	84.1
1914,	126	25	3,239,256	154,315	2,209.6	182.9
1915,	126	29	4,195,086	120,350	2,718.3	168.6
Totals,	815	113	15,825,242	728,049	8,938.7	775.1

See statement elsewhere in this pamphlet for approximate number of trees planted in 1916, and area covered.

WHAT THE DEPARTMENT OF FORESTRY HAS ACCOMPLISHED.

(This summary is complete to January 1, 1916.)

Total area of State Forests (Acres),	1,012,098
Total cost of State Forests,	$2,309,943
Average cost per acre,	$2.28
*Present value of State Forests,	$6,000,000
†Foresters trained at the State Forest Academy,	78
†Foresters now in Pennsylvania Forest Service,	62
Rangers now in Pennsylvania Forest Service,	82
Trees planted to date on State Forests, about,	23,000,000
Area planted to date on State Forests, (Acres),	12,000
Trees planted on State Forests spring 1916,	5,500,000
‡Trees distributed to private individuals,	1,500,000
Total number forest nurseries established,	26
Trees now in stock in State Forest nurseries,	13,000,000
Nurseries with annual capacity of 1,000,000 or over,	4
Miles old road opened by the Department,	1,265
Miles new road built by the Department,	316
Miles trail built by the Department,	529
Miles boundary line opened by the Department,	1,057
‖Miles fire lane opened by the Department,	727
Total length roads, trails, fire lanes, and boundary lines,	3,894
Boundary line surveyed but not opened,	1,637
§Telephone line built (miles),	254
Forest telephones connected,	86
¶Fire towers erected,	101
Springs cleaned and walled,	1,168
Fish planted by State foresters,	1,000,000
Camp sites leased,	300
Income from State Forests,	$125,000

WHY IS THE DEPARTMENT OF FORESTRY?

(1) The natural resources of any Commonwealth must be managed for the good of that Commonwealth as a whole, and not for the benefit or enrichment of any particular person, clique, or corporation.

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*This is a very conservative estimate of the actual present sale value of the State Forests.

†Correct to July 1st, 1916.

‡An act of the last Legislature authorizes the free distribution of trees under certain conditions. See article elsewhere in this pamphlet.

‖These lanes are kept free of all inflammable material, and are from 4 to 60 feet wide.

§221 miles of this line is metallic circuit, and 33 miles ground circuit. The average cost of construction is only $52.12 per mile. Instead of 200 miles, the Department should have 2,000 miles of telephone line.

¶27 of these towers are built of wood, 7 are of steel, and the remainder are built in trees. The towers are so located that large areas of forest land may be viewed from them, and men are in constant duty on the towers during fire season.

(2) Our forests exercise a direct influence on every part of the State, and on the lives of its citizens; therefore they are one of the most important of our natural resources, and must be managed for the best good of the whole people.

(3) Our cut over forest lands are not so managed, and cannot be so managed by private owners.

(4) Therefore the only solution is State ownership and State management of forest lands which, under private ownership, would become barren and permanently unproductive, and a menace instead of a benefit to the public.

If you admit the truth of the first of these statements, you cannot deny the truth of the other three, for they are the logical outgrowths of the first. Our forests are a common inheritance, and should be passed on undamaged as a common bequest to succeeding generations.

Forestry means the management of forest lands in such a way that they shall be kept productive for all time. The forester proposes to raise successive tree crops in the forest just as the farmer raises successive grain crops on his farm, and he proposes to do it in a way that the mature crop shall not only pay for the cost of the operation, but return a profit at the same time.

Forestry is not a get-rich-quick scheme. It requires a considerable outlay of capital at the start, and it means a long term investment. Returns of any consequence cannot be expected from forestry in much less than fifty years. Hence forestry is not attractive to private capital, and our lumbermen, when they had cut over a tract of virgin timber, moved on to another tract, and left the cut over tract to care for itself. Forest fires followed, and destroyed what few trees were left by the cutters. After some years of this procedure, it became apparent that if this cut over land was to be prevented from becoming permanently worthless, it must be acquired by the State, what trees there were on it must be protected, and trees must be planted where there were none.

These are the reasons, in brief, for the existence of the Department of Forestry. Its chief purpose is to restore Pennsylvania's forests, and to maintain them perpetually for the benefit of the whole people. It was not created to furnish desk jobs for soft snap hunters, and the men of the Pennsylvania Forest Service are not political appointees. They are enthusiastic in their work because they believe in it. They do not prescribe forestry as a remedy for every human ill, but they do say this:—Look at your tax rate closely; see how it mounts from year to year; observe the direct relation it has to the cost of living. What will it be when your grandchildren have taken your place? When a tax is put on coal, who pays it? When a stamp tax is decreed, who buys the stamps? When five million acres of land in your State are so devastated that they are scarcely worth assessing, whose land makes up the deficit in taxes?

Suppose that the State owned these five million acres of land,—as it should,—and made them produce timber; and suppose that fifty years from now it received a net revenue of only a dollar an acre a year from the land,* would this not be lessening the burden imposed by the cost of government?

HOW YOU MAY SECURE A LEASE FOR A PERMANENT CAMP SITE.

AN ACT

Authorizing the Department of Forestry to lease portions of the State Forests for church, school, health, and recreation purposes.

Section 1. Be it enacted, etc., That the Department of Forestry is hereby authorized to lease, for a period not exceeding ten years, on such terms and conditions as it may consider reasonable, to any citizen, church, organization, or school board of Pennsylvania, such portion of the State Forest as the Department may deem suitable, as a site for a temporary building to be used by such citizen or family for health and recreation, or as a site for church or school purposes.

Under the provisions of this act the Department has already leased 300 camp sites. In accordance with a ruling of the Commission, the sites leased may be not over two acres in area, shall not be used for conducting any business, and shall be kept in good condition by the lessee. The rental charged is nominal, and averages about $5 a year. Buildings may be erected on the sites, in which case the forest officers shall have the privilege of using them when necessity arises.

All the State Forest camp sites are numbered. If you want to lease a site, write to the forester in charge of the Forest on which the site is located for the number of the site, and then write to the Commissioner of Forestry, at Harrisburg, saying that you want to lease camp site number so and so. The forester will be asked to report on the site, and on your reputation and past conduct on the Forest. If there are no obstacles in the way, you will be informed that your application has been granted, and on the payment of the first year's rental you will be given a lease good for ten years.

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*Forest land in Germany, which has been under scientific forest management for almost three centuries, gave an average *net* return of $2.70 an acre in 1890. The net revenues from the different German state forests were from $0.96 to $4.40 per acre per year.

APPROPRIATIONS FOR THE DEPARTMENT OF FORESTRY AND WHAT THEY ARE SUPPOSED TO ACCOMPLISH.

1915—1917.

For labor on the State Forests there was appropriated the sum of $85,000, or $42,500 per year. With a million acres of land to care for, this means that $0.00425 may be spent each year on an acre! No figures are available to show how many years it would take to bring an acre of forest land to the top notch of productivity with an expenditure of four-tenths of a cent a year.

For foresters' and rangers' salaries and expenses there was appropriated the sum of $225,000, or $112,500 per year. With 1,012,000 acres of land in the State Forests, allotting 15,000 acres to each forester, and 5,000 acres to each forest ranger, the Department should have a force of about 70 foresters and 200 rangers. Counting the average forester's salary as $100 per month, and the average ranger's salary as $50 per month, we have an annual expenditure of $84,000 for foresters' salaries and $120,000 for rangers' salaries, or a total of $204,000 a year,—all to be paid from an appropriation of $112,500.

For the purchase of new land there was appropriated the sum of $40,000, or $20,000 a year. This means that at the price now being paid for land about 8,000 acres a year can be bought. To acquire another million acres of land at this rate would take just a century and a quarter.

For the expenses of the members of the State Forest Reservation Commission there was appropriated the sum of $5,000, or $2,500 per year. This appropriation is supposed to cover all expenses of the members of the Commission. They receive no salaries. They are supposed to examine all forest land purchased, all land offered as auxiliary forest reserves, to make inspections of the State Forests, and to attend to other matters in line with their duties which take them from end to end of the State. $2,500 a year means $500 for each of the five members of the Commission. At the rate of ten cents a mile, to include all charges and hotel bills, this means that each member may travel 5,000 miles a year, or a little over 400 miles a month—barely enough to take him to and from the monthly meeting of the Commission at Harrisburg.

For the purpose of preventing and extinguishing forest fires there was appropriated the sum of $45,000, or $22,500 per year. This amount is not for the State Forests only, but for the whole eight million acres of forest land in Pennsylvania. And it is for prevention and extinction both. It figures out to less than three-tenths of a cent per acre.

WHO'S GUILTY?

EXTRACTS FROM THE REPORT OF THE CHIEF FOREST FIRE WARDEN.

There is no longer any question as to the value of forests and the necessity for their protection and economic management. The benefits of well-cared-for forests are well recognized, and yet the everyday attitude toward forests does not correspond with what is generally believed to be the attitude which every citizen should have, whether a timber owner or not. In caring for forests, as in the management of any other property, the foundation principle at stake is protection, and undoubtedly the one factor against which we have to work most is the forest fire. A timberland owner may practice the most reasonable methods of forestry, including natural and artificial regeneration, all classes of improvement cuttings, a careful harvesting of the crop, and yet if the propery is subject to damage from fire and protection therefrom not provided, all of the other things are practically lost. Any man who would conduct a business in such a way as not to provide reasonable protection for his investment and carry insurance, would be called an unsafe business man, and, in fact, few people would hesitate to call him a fool.

Even antedating the beginning of our Commonwealth, there were laws against the setting of forest fires, but practically no attention was paid to them until it was not uncommon to find people who thought that forest fires were a part of the natural order of things, and in many cases that belief still remains. In more recent days, since the development of the forestry idea in Pennsylvania, efforts have been made to solve the forest fire problem, but it is not solved yet. The greatest difficulty in the way is the ignorance and indifference of the people. If they could only realize that every year we are permitting the burning up of millions of dollars worth of property, and bringing upon ourselves untold miseries as an indirect result of these fires, it is believed that some change in the general attitude would result. If, in any one of our towns or cities, there were a fire which would destroy, in a short period of time, a million dollars worth of property, there would not be a newspaper in the country which would not deplore the tremendous loss. The chances are that an investigation would be made into the management of the fire department, and everybody would be aroused to the necessity of preventing a recurrence of such a tremendous loss. Again, if all the indirect losses which come from forest fires, namely, loss of life; of property other than timber; inconveniences because of lack of water and the consequent sickness and death; loss of wages and taxes; depriving the citizens of game and fish; placing a community in the midst of desolation, and so forth: if these losses could be put before the people definitely in dollars and cents, the whole State would open up its sympathetic heart and try to alleviate the loss. Probably some effort would be made to prevent a similar catastrophe happening again in that particular community, ***but it is a large question as to whether or not any general preventive measures would be taken to forestall the occurrence of a similar calamity in any of the other communities of the State.***

Because of forest fires there are at least 5,000,000 acres in Pennsylvania which are kept in a non-productive state, and this vast area is constantly increasing. Some of this land is now in such condition that it will never be able to produce anything in the way of tree growth. Much of it, however, is still in such shape that tree growth could be restored, but with repeated fires and with continued erosion, the absolutely and permanently barren land is also on the increase. At a minimum figure, the citizens of this Commonwealth are losing $20,000,000 a year because of the non-production of timber which might be growing upon these areas. What is lost from the indirect effects of such an area of desolation, in the way of floods, destruction of agricultural lands, ill health, loss of life, and loss to industries other than lumbering, no one can figure out. Truly, we are an extravagant people, burning up millions of dollars, and sitting supinely by and watching the smoke!

There are approximately 8,000,000 acres of forest land in Pennsylvania. All of it is exposed to the curse of fire. An average of 500,000 acres burns over each year. Most of it is burned over once every ten years. No system of forest management can flourish under such conditions. The direct loss from these fires is close to $1,000,000 a year, and the indirect loss is incalculable. No people can forever suffer such a useless loss, nor is it sensible to expect them to. The mere fact that they do not realize the loss is no excuse for the State's permitting the condition to exist.

But as a safety measure the Legislature has permitted the expenditure of $2,300,000 to purchase 1,000,000 acres of land, and an additional inadequate sum of $1,250,000 for the development of that land, most of which will require an expenditure of $25 per acre to put it in productive shape. It limits the purchase price per acre to $10, and expects the Department of Forestry to protect and develop its own forests with an additional $1.25 per acre to date. Even if adequately supported, the State's 1,000,000 acres in good condition would not offset the harm of the other 7,000,000 in desolate condition. It authorizes the planting of seedlings, but fails to prevent the burning up of millions of little trees for every thousand planted. It inadequately provides for what the State itself already owns; it is satisfied to appropriate $250,000 toward an experiment to eliminate the chestnut

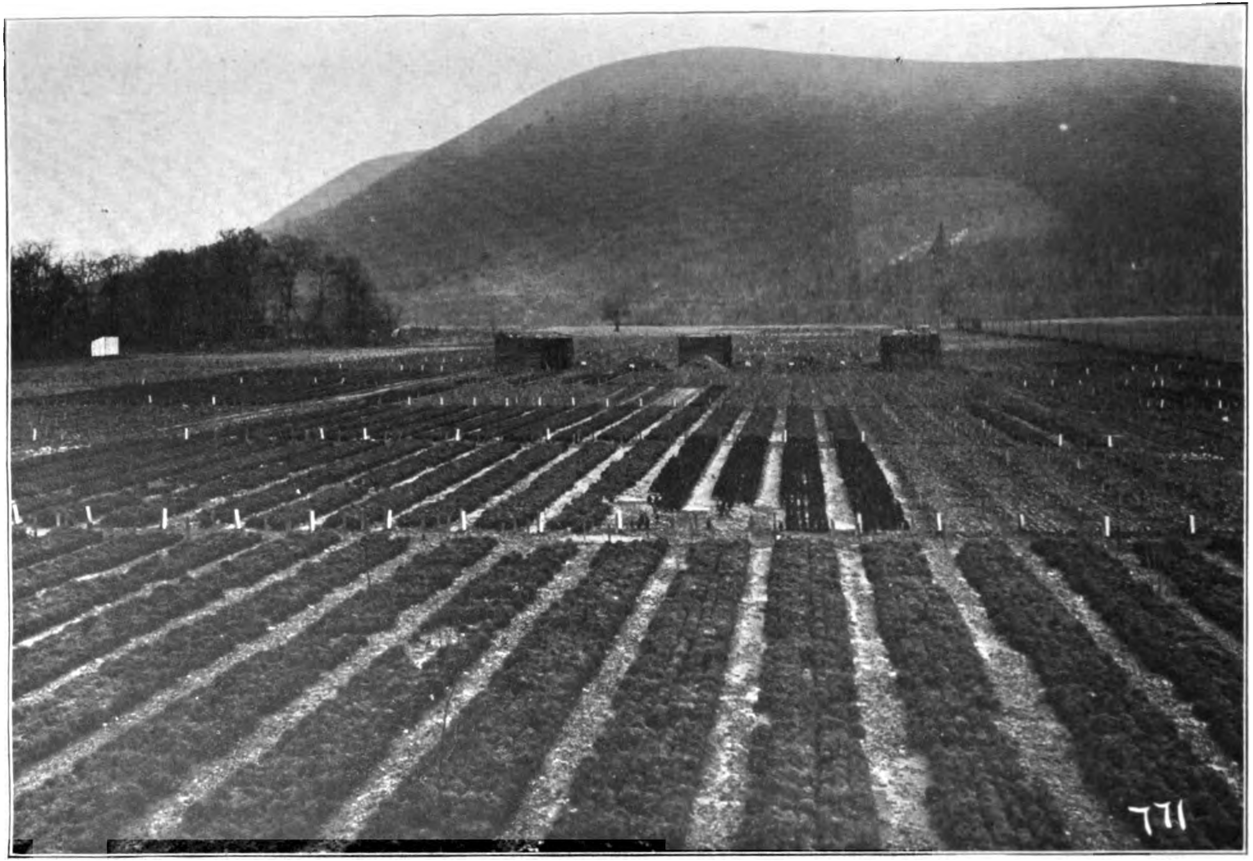

Fig. 5. How the Department of Forestry repairs the damage done by forest fires. The Asaph State Forest Nursery, which furnishes annually nearly 2,000,000 trees for reforesting.

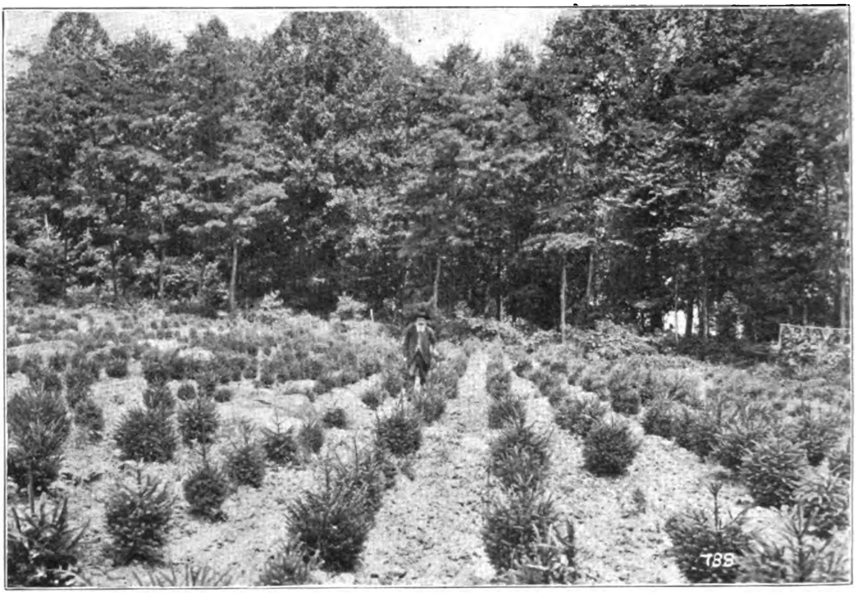

Fig. 6. The first stage in replacing the forest. A plantation of young forest trees

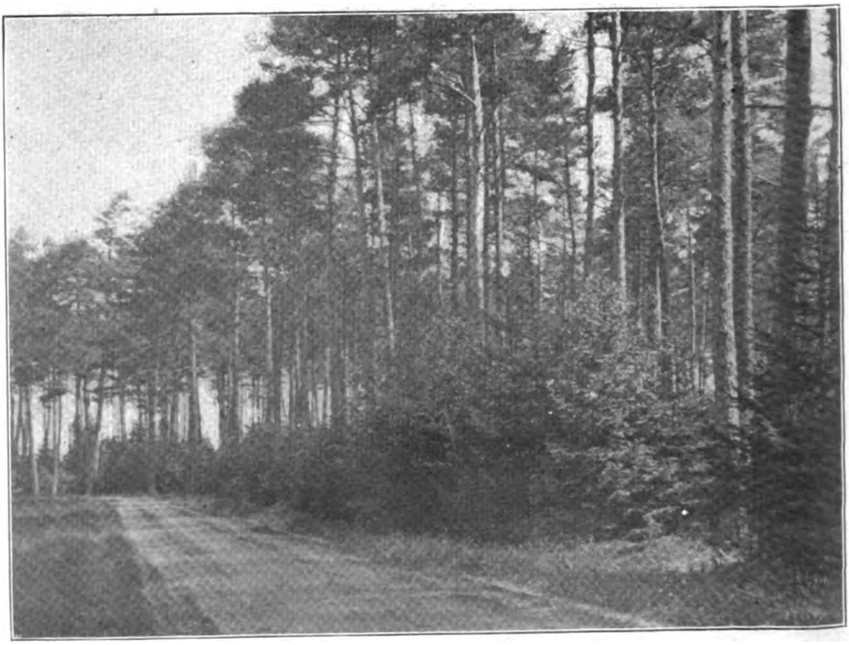

Fig. 7. A later stage—the forest replaced. Note the large trees, the smaller trees which will take their places, and the good roads.

blight, but sees fit to appropriate only $45,000 for two years to protect the total forest area of 8,000,000 acres in accordance with a plan which is not an experiment, but which has proved its efficiency in other States, and upon our own State Forests. Surely it is cheaper at $100,000 or even $200,000 per year, to protect all the forests from fire than it is to appropriate $45,000 for two years, and permit the people of the State to lose from $20,000,000 to $50,000,000 each year.

Since June 1, 1909, the appropriations for forest fires have been as follows:

Period Covered.	Amt. Asked.	Amt. Granted.
June 1, '09—June, 1, '11,	......$80,000	......$50,000
June 1, '11—June 1, '13,	 60,000	 50,000
June 1, '13—June 1, '15,	 50,000	 50,000
June 1, '15—June 1, '17,	150,000	 45,000

This shows a total appropriation used for forest fires from June 1, 1909, to June 1, 1915, amounting to $150,000, which amount was increased by deficiency appropriation to a grand total of $177,162.37, or an average of $29,527 per year. The average for the two years June 1, 1909, to June 1, 1911, was $40,397.82, which is almost as much as has been aside for the reorganization of an efficient system of fire wardens and for fire prevention and extinction during two years. Surely the organization must be at the highest pitch of efficiency at once—which is impossible—or the forest fire seasons during the next two years must be extremely unfavorable for conflagrations, which is not probable, or the Legislature must be asked for a large deficien which is certain, and which is poor business.

It should be noted that four deficiency appropriation bills, carrying amounts aggregating $48,000 or almost a fourth of the total appropriations, were passed between 1909 and 1915.

The original appropriations, as well as these for deficiency, were used only for paying bills for the *extinction* of forest fires. The amount spent for work which could be called prevention was inconsiderable. This makes more apparent the folly of allowing $22,500 a year for extinction and prevention combined, when past experience shows that this sum is insufficient for extinction alone.

Both Massachusetts and New York appropriate a cent per acre per year for fire protection. The average acreage per fire in Massachusetts in 1914 (the latest figures) was 12½ acres. In New York the average acreage per fire in 1914 was 33¼ acres, while in Pennsylvania in 1913 it was 508; in 1914, 305; and in 1915, 300. Pennsylvania appropriated three-tenths of a cent per acre. This is a tremendous indictment against the people and the fire protective system which they have provided. An effective organization is possible, and Pennsylvania ought to have it.

STATE GAME REFUGES.

A State Game Refuge is a tract of wild land of about 3,000 acres, controlled by the State Game Commission, and surrounded by a cleared line and a single wire, stretched about waist high. Each refuge is placed in charge of a Game Preserve Keeper, whose duty it is to extinguish and prevent forest fires in and near the refuge, destroy vermin, feed the game, enforce the game laws, and especially, guard the refuge against poachers. No one is permitted to hunt at any time within a refuge, or even to enter its bounds during the open season for game, nor is any one allowed to carry fire arms within it, or to permit a dog to enter it.

Each State game refuge is, therefore, a haven of rest into which game of all kinds may retreat, live, and breed in safety; then to spread into the surrounding region for the benefit of sportsmen. Each State game refuge furnishes more deer, wild turkeys, ruffed grouse, and other local game, than any game farm in the United States, and at only a fraction of the cost necessary to run a game farm, where attempts are made to raise game in captivity.

The State Game Commission now has under control fourteen game refuges, located both in State Forests and on leased land. The first was established in 1905 on State land in Clinton county; the second in Clearfield county on State land; the third in Franklin county on State land; the fourth in Perry county on State land; the fifth in Westmoreland county on State land; the sixth in Centre county on State land; the seventh in Potter county on State land; the eighth in Lycoming county on State land; the ninth in Huntingdon county on State land; the tenth in Carbon county on State land; the eleventh in Lackawanna county on State land; the twelfth in Bradford county on leased land; the thirteenth in Sullivan county, on leased land; and the fourteenth in Cameron county on leased land. The last named eight refuges were created since June, 1915.

The Game Commission believes that there should be a refuge in every county which has sufficient wild land for the purpose, either State land, or suitable private land which may be leased without restrictions for a period of not less than fifteen years, and perferably for twenty-five years. In the case of leased lands, the Commission desires to secure control of 3,000 acres to be enclosed as a refuge, and an additional 3,000 acres surrounding it, which will be open to hunters during the open season for game.

The Commission is anxious to have the sportsmen help them to do the many things necessary in order that conditions may be improved. If you know of a tract of suitable land in a county in which there is now no refuge, or if you know of a violation of the game laws in any part of the State, you will be benefitting yourself, as well as other sportsmen, by writing to the State Game Commission, at Harrisburg.

COUNTIES IN WHICH STATE FORESTS ARE LOCATED, AND ACREAGE.

County.	Acres.
Adams,	20,886
Bedford,	10,018
Cameron,	81,194
Centre,	79,388
Clearfield,	47,506
Clinton,	129,090
Cumberland,	20,605
Dauphin,	3,354
Elk,	14,840
Franklin,	34,528
Fulton,	6,300
Huntingdon,	57,285
Juniata,	3,178
Lackawanna,	4,956
Lycoming,	88,927
Mifflin,	49,527
Monroe,	6,401
Perry,	27,168
Pike,	57,462
Potter,	129,607
Snyder,	19,087
Somerset,	3,468
Tioga,	57,406
Union,	53,675
Westmoreland,	5,065
Wyoming,	1,177
	1,012,098

MAY 8 1920
EXCHANGE

Commonwealth of Pennsylvania

DEPARTMENT OF FORESTRY

BULLETIN No. 15

Reforesting Pennsylvania's Waste Land

What and How to Plant

BY
W. GARDINER CONKLIN.
In Charge of the Bureau of Silviculture and Mensuration

Issued by Direction of the Commissioner of Forestry

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER.
1916

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* * *

PENNSYLVANIA DEPARTMENT OF FORESTRY.

Robert S. Conklin,
Commissioner of Forestry.

Irvin C. Williams,
Deputy Commissioner of Forestry.

STATE FORESTRY RESERVATION COMMISSION.

Robert S. Conklin,
President.

S. B. Elliott,
Wm. P. Stevenson,
J. M. Hoffman,
George B. Lewis.

BUREAU OF SILVICULTURE AND MENSURATION.

W. Gardiner Conklin, in charge.
Raymond B. Winter, Assistant.

LETTER OF TRANSMITTAL.

Hon. Robert S. Conklin,
Commissioner of Forestry.

Dear Sir:

The many inquiries received from persons throughout the State requesting information on reforesting waste lands have prompted the preparation of this bulletin, "Reforesting Pennsylvania's Waste Land." It has been written for the purpose of advising interested persons how to reclaim their waste land, where to obtain the planting stock, the species best to plant, and how the planting should be done.

The information herein contained has been gleaned largely from data obtainable as the result of planting on Pennsylvania's State Forests. This opportunity is taken to thank the field force of foresters for supplying much of the data.

Appreciation of the assistance rendered by Prof. J. S. Illick, of the Pennsylvania State Forest Academy, who supplied the habitats of the species suggested for planting is hereby tendered.

The illustrations given are practically all from the collection belonging to the Pennsylvania Department of Forestry. Except when otherwise noted, the illustrations are from photographs taken by the author. Special mention should be made of those taken in plantations on the Jacob Nolde Estate, Berks county, by District Forester James E. McNeal.

The bulletin is presented with the hope that it will be published and distributed freely throughout the State.

Very respectfully yours,
W. GARDINER CONKLIN,
In charge of the Bureau of
Silviculture and Mensuration.

Harrisburg, Pa.
November 27, 1916.

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REFORESTING PENNSYLVANIA'S WASTE LAND.

WHAT AND HOW TO PLANT.

PART I.

Introduction.

A conservative estimate places Pennsylvania's forest area at approximately 7,500,000 acres, of which 5,000,000 acres are in a non-productive condition. The remaining 2,500,000 acres are producing timber suitable for lumber. These 7,500,000 acres of land are largely mountainous and because of their steepness, rocky condition, and lack of fertility, are not adaptable for any purpose except the production of lumber. A large proportion of the 5,000,000 acres can be made productive only by the planting of forest trees, and a systematic effort should be made by every owner of such land to plant at least a portion of his holdings each year. If this be done, Pennsylvania can produce lumber sufficient not only for its own use, but can supply millions of feet annually for use outside of the State.

Why is this land in its present barren condition? It was once covered with forests, why not now? In brief, because after the original forests were cut, the land was left to take care of itself. Forest fires started and little or no attempt was made to check them unless they endangered mature growth or rural habitations. These fires burned repeatedly over the mountains, destroying all chance of natural regeneration, leaving the lands barren and waste. This condition exists particularly throughout the coal districts and the plateau region in the northern part of Pennsylvania. To the layman, the land appears entirely worthless, but not so to the forester. He sees the possibilities of the land when planted to forest trees. He also sees that protection from forest fires is the first necessity.

It is estimated that, in addition to the 7,500,000 acres of forest land, there are in Pennsylvania 2,000,000 acres of waste farm land. This land was cleared but now proves worthless for agriculture. A portion of it, no doubt, is used for grazing purposes, but undoubtedly with little success. Such land should be planted with forest trees.

WHY WASTE LANDS SHOULD BE REFORESTED.

Two of the most substantial reasons for reforesting are the need for protection of water sheds. These in themselves are sufficient but many others may be cited. The essential economic aspects, lumber production and water shed protection, are to be considered here.

Taxes are being paid annually, or supposedly so, on five million acres of land in the State from which the owners are receiving little or no return. The land represents idle capital—money,—producing no interest on the investment. Every instance of this sort means a direct financial loss to the owner.

In 1860, Pennsylvania produced more lumber than any other State in the Union. In 1880, she stood second with an annual cut of 1,733,844,000 board feet. In 1915, the reported cut was 657,853,000 board feet and her standing as a lumber producing State was twentieth. Lumbering in past years was done without apparent thought for the future. Forest fires followed lumbering, completing the destruction of our forests. Now, nearly one-fifth of the State, so far as surface value is concerned, may be classed as unproductive. The only way to reclaim this land is by artificial reforestation, i. e., planting.

Protection of water sheds is a matter of most vital interest to every resident of the State. A continuous supply of pure water is essential to health and prosperity. Where better can pure water be had than direct from forested areas? It is a fact undeniable that a more uniform flow of water is had from land covered with dense forests than from agricultural lands or waste areas. The humus of the forest floor is a sponge. It holds water, allows it to run off gradually, and thus regulates the supply. Whenever possible, watersheds, particularly the source of drinking water, should be in forest; or, if devoid of tree growth, they should be reforested by planting. Many water companies own or control a portion of the lands which are the source of their water supply. Forests on these lands would not only assure a purer and more uniform flow of water, but would eventually mean an additional source of revenue to the companies. Under proper forest management, timber may be removed without noticeable injury to the protective covering of the water shed.

CLASSES OF LAND IN PENNSYLVANIA WHICH SHOULD BE REFORESTED.

Practically all types of land in Pennsylvania which should be planted to forest trees may be placed in one of the classes described below. Much of the land given in this classification is now practically barren of commercially valuable species and must be planted to make it productive.

Fig. 1. WASTE AREA.

Destructive lumbering followed by forest fires have laid this land waste. It should be protected from fires and planted with trees.

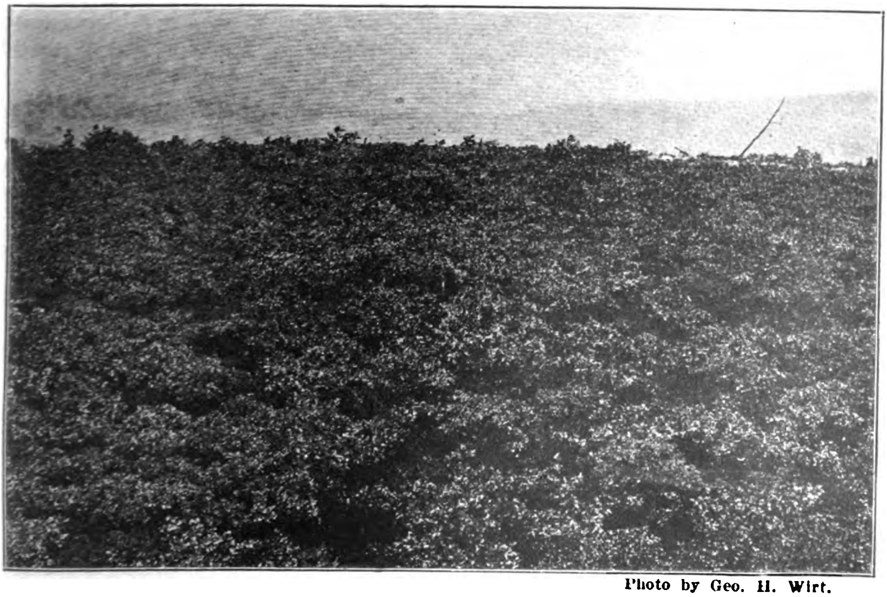

Photo by Geo. H. Wirt.

Fig. 2. SCRUB OAK BARREN.

Thousands of acres of this class of land are found in Pennsylvania. The scrub oak should be replaced by planting valuable species.

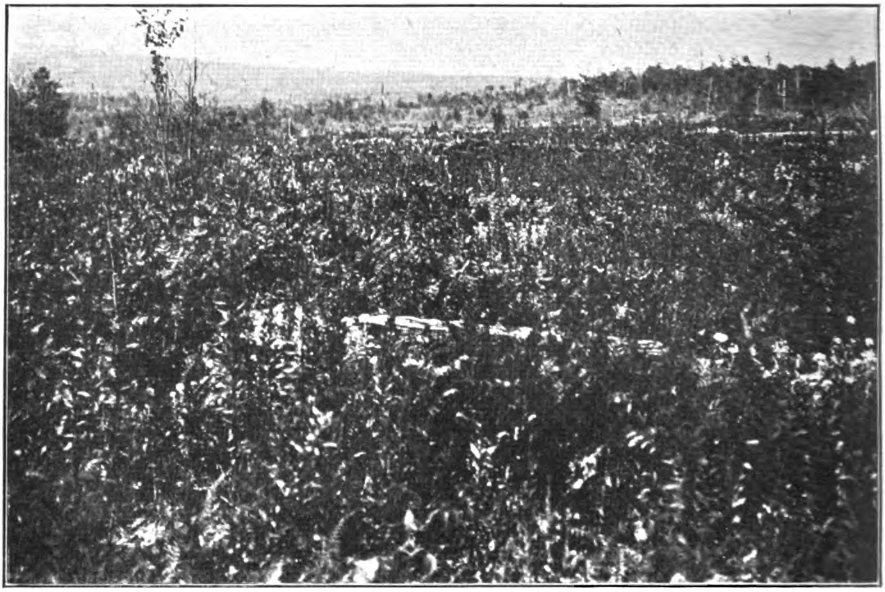

Photo by Geo. H. Wirt.

Fig. 3. AREA OF BRACKEN AND WEEDS.

Now waste land. It once produced the best of timber. This land should be planted.

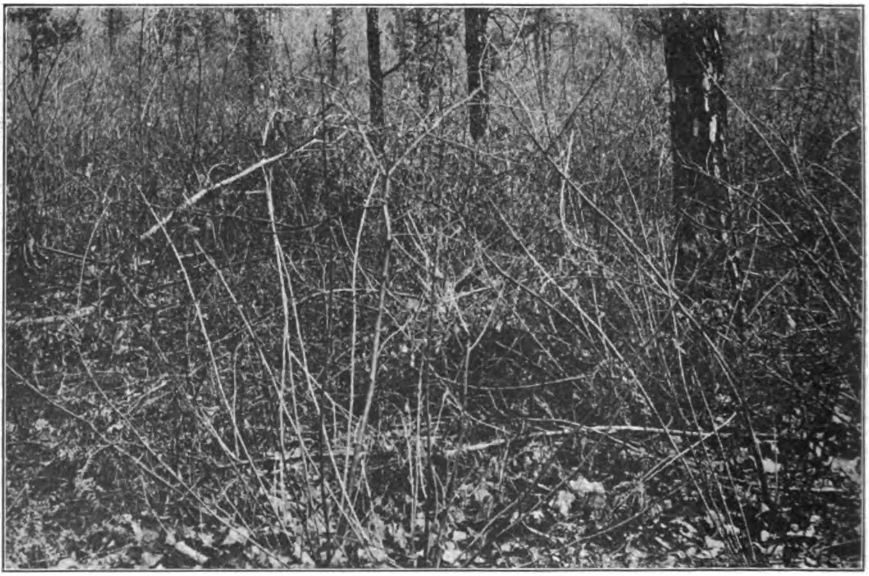

Fig. 4. BRUSH LAND.

Reproducing nothing of value. The brush was subsequently burned and the area planted with white pine, Norway spruce, and Scotch pine.

Class I. Areas originally farmed but which have proved unsuitable for agricultural purposes. Land in this class may be found in all parts of Pennsylvania, especially on steep slopes.

Class II. Farm woodlots. It frequently occurs that the woodlot contains few species of commercial value, due to improper management or other cause. These woodlots should be underplanted or reenforced with valuable species. Practically every farm has its woodlot, and many of them are in immediate need of restocking with useful species.

Class III. Second growth hardwood lands. These are producing some few trees of value but of inferior quality due to decay following injury by fires. Lands of this type are common throughout Pennsylvania and comprise a considerable part of the mountainous region in the central and southwestern portion. Much of this class of land should be underplanted with commercially valuable trees. Defective trees ought to be removed either before planting, or after the planted trees have reached a height of ten to twenty feet. They should not be cut at the expense of injury to the planted trees.

Class IV. Water sheds, particularly the source of water used for drinking purposes. Land in this class may also be included in any of the other classes.

Class V. Areas covered with bracken and sweet fern. Land of this sort is found throughout the State but more particularly on the plateau regions of the north central and northern portions. It frequently is land which originally produced the best of white pine timber, but was left to devastating fires after lumbering and is now entirely or in part, devoid of trees. Such land can be planted and made to produce lumber as good or even better than that cut from the former virgin forest. Considerable areas of this type comprising State Forests have been planted successfully by the Department of Forestry. See Figure 3.

Class VI. Coal and oil lands from which the forests have been cut and the surface severely burned. Land of this type is found in the central eastern portion of the State, and throughout the western part beyond the Allegheny Mountains.

Class VII. Scrub oak barrens, land which formerly produced valuable coniferous and hardwood timber but which was left unprotected after the timber was cut. Scrub oak, a non-commercial species and a prolific sprouter, the roots of which are seldom killed by fire, is light demanding and quickly dies out when over-topped. Planting this land is difficult and expensive, and the planted trees grow slowly. However, when they once shade the scrub oak, it quickly dies out. This type of land is found in all parts of the State but more especially east of the Allegheny Mountains.

A PLANTATION DEFINED.

The term plantation, as used in forestry, considers the planting of an aggregation of young trees with the idea of forming a forest or woods. As used by the Department of Forestry, the term implies the contiguous area planted in any one year. In case an immediately adjacent area is planted in other years, that planting is regarded as a separate plantation. This meaning of the term has been adopted simply as an aid in systematizing planting records. A broader use of the word would allow the plantings of separate years to be conjoined as one plantation.

A plantation may be made either where no trees exist or where they do exist but not in sufficient number to produce the maximum of wood volume per unit of area. The latter is termed a "reenforcement of natural growth" and the operation that of "under planting."

Reenforcing is frequently necessary or advisable in established plantations. Not all the trees planted live and if the area planted is to be fully stocked, filling in should be done in the fail spots.

SUCCESS OR FAILURE OF THE PLANTATION.

The success or failure of a plantation depends on a great many factors, most of which may be influenced or controlled by human endeavor. Among the more important factors which influence success and which must be carefully considered before planting, are soil, climate, and existing growth; also topography, including altitude, angle of slope, and aspect. The species to be planted should be such as are adaptable to the site, that is, to the soil, topography, etc. Adverse conditions of the planting site require more careful selection of the planting stock, both in regard to species and quality of stock, and the degree of care in the planting.

To the layman the various factors influencing success are not apparent or understood, and persons are cautioned not to engage in extensive planting operations without receiving advice and suggestions from a competent authority, such as a trained forester. A forester should make a very careful examination of the planting site and consult the owner on the purpose of the planting before designating species to plant. Upon his judgment depends largely the success or failure of the venture.

SPECIES TO PLANT.

Any species of tree which grows naturally in a locality may be used, but it is best to choose such species as will produce the most valuable wood, depending, of course, on the purpose for which the plantation is made. It should be remembered that most of our hardwood or broad-leaved trees (oaks, chestnut, maples, etc.) are better capable of being reproduced naturally than are the conifers or softwood species (pines, spruce, larch, hemlock, etc.). In consequence, by far the largest proportion of artificial reforesting is done with evergreen species. Out of a total of 22,045,311 trees planted on Pennsylvania State Forests to date, 20,828,775 were conifers.

Different species require different soil and soil moisture conditions to produce normal rate of growth and these factors must be considered in choosing the species to be planted. Among the more valuable trees to plant, and the conditions in which they may be expected to succeed best are:

CONIFERS OR SOFTWOOD TREES.*

White pine (Pinus Strobus).—Prefers a fertile, moist, well-drained soil, but will grow well on dry sandy soils and gravelly slopes. Common on banks of streams, river flats, in hollows and ravines, but rarely found in swamps. Any habitat in its natural range will be favorable to its development except swamps and ridges exposed to severe winds.

Pitch pine (Pinus rigida).—Common on dry burned-over areas, sterile plains, gravelly slopes, rocky cliffs, and sometimes found in swamps. In the glaciated area it is common on rocky glacial soil.

Red pine (Pinus resinosa).—Usually found on dry gravelly ridges, mountain tops, and dry sandy plains. Rare on flat lands with wet clay soil.

Short leaf pine (Pinus echinata).—Common on poor, sandy, or clayey soil. It is a tree of the plains and foothills. Reaches west of the Mississippi. In the east it is usually mixed with hardwoods.

Scotch pine (Pinus sylvestris).—This species is indifferent to soil requirements, water, heat of summer, and cold of winter. It will grow on all classes of soil, even dry, sterile sand. The rate of growth depends more on the physical structure than the chemical composition of the soil. It prefers deep well drained sandy loam. It is very intolerant of shade.

Norway spruce (Picea Abies).—In Europe it grows in valleys and upon the mountain slopes. It prefers rather rich moist soils, in this respect somewhat resembling the white pine. It cannot endure very dry, very sterile, or extremely rich vegetable soil. It is rather tolerant of shade and somewhat susceptible to late frosts.

European larch (Larix decidua).—Not native to America but planted here with every indication of success. Thrives on well-drained, deep, and moderately fertile and loose soil. Does not thrive in wet situations nor in pure sands. It is decidedly intolerant of shade. Found chiefly in the Alps and Carpathians up to about 8,000 feet.

Japanese larch (Larix leptolepis).—This tree is native to the central part of Japan, chiefly at high altitudes upon soil of volcanic origin. Makes its best growth in soil rich in lime and in cool to cold climates. In warm climates the tree becomes branchy, the wood coarse-grained and the growth rings wide. Dr. Mays states that it will grow wherever Norway spruce thrives. Grows rapidly in youth. Falls behind the European larch about the 20th year. A specimen near Munich attained a height of 45 feet and a diameter (D. B. H.) of 11 inches in 22 years. The planting of this species is still in the experimental stage and not to be too highly recommended.

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*Habitats supplied by Prof. J. S. Illick of the Pennsylvania State Forest Academy.

Bull pine (Pinus ponderosa).—Like Scotch and Jack pine, this tree is not particular to soil, but will reach good development even on arid soils and dry mountain slopes. It is one of the species best suited to dry, sandy and gravelly soils.

Jack pine (Pinus Banksiana).—Like Scotch pine in its habitat. Thrives on sandy, sterile soil.

HARDWOODS, OR BROAD-LEAVED TREES.*

White oak (Quercus alba).—It is tolerant of many soils, growing on sandy plains, gravelly ridges, rich uplands, and moist bottom lands. It reaches its best development in rich moist soil.

Red oak (Quercus rubra).—Prefers porous sandy or gravelly clay soil. It will not grow in wet soils and is also intolerant of shade, except when young.

Honey locust (Gleditsia triacanthos).—It develops best in rich soil along moist river bottoms but will grow in any fertile soil which is not too wet. It demands plenty of light.

Black locust (Robinia Pseudo-Acacia).—Grows vigorously on moist fertile soil, especially on rich bottom lands and along mountain streams. Also grows on rather rocky and sterile mountain slopes. Frequent on abandoned charcoal hearths and mud-dams found near ore mines.

Sugar maple (Acer saccharum).—It flourishes best on well drained rich soil, but will thrive even when the soil is not rich. It is common on low ridges at the base of the mountains, and along slopes. It reaches its best development in central New England, New York, northern Pennsylvania, and the Lake States.

Black walnut (Juglans nigra).—Prefers rich moist soil. Requires plenty of light and deep soil since it is evidently tap-rooted.

Black cherry (Prunus serotina).—Thrives best on rich alluvial soil and fertile slopes. It will grow on dry and often rather sterile slopes. On account of its long tap-root it requires loose deep soil.

Tulip poplar (Liriodendron Tulipifera).—It prefers deep, rather rich, and moist soil. Common along streams, on islands, upon semi-swampy areas, and at the base of mountain slopes. Sometimes found on the top of mountains especially where small streams and springs are prevalent. Usually occurs as scattered individuals mixed with other hardwoods and sometimes white pine and hemlock. Does not thrive on limestone soil. Common along mountain streams until they enter limestone valleys, then disappears.

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*Habitats by Prof. J. S. Illick of the Pennsylvania State Forest Academy.

White ash (Fraxinus americana).—Prefers fertile, moist soils; very common in rich, moist woods and along streams, lakes, and other bodies of water. Occasionally found on rather dry hillsides.

Basswood (Tilia americana).—Rarely grows in pure stands, but usually mixed with other hardwoods. Prefers rich soils in bottom lands. It can endure considerable shade. It suffers little from windfall but occasionally from windbreak upon exposed situations.

Sycamore (Platanus occidentalis).—Prefers moist, fertile soil, but will grow in rather dry soil. Best development in the moist valleys of the Ohio and Mississippi rivers. It may be grown from cuttings or from seed.

Shell-bark history (Carya ovata).—Prefers rich moist soil and plenty of light. Common in the valley and in moist hillside woods. Also common along streams, and on the border of swamps.

Pignut hickory (Carya glabra).—Most common on dry ridges and hillsides. Rarer in swampy situations. Commonly scattered amidst our oaks and chestnut. Prefers plenty of sunlight.

Black birch (Betula lenta).—Usually found in rich soil and on dry slopes but also common on rocky mountain slopes and tops. Common on the rocky ridges of the South Mountains in Pennsylvania.

Beech (Fagus grandifolia).—Commonly found on rich moist bottom lands, but also abundant on gravelly slopes and rich uplands. It endures dense shade and variations of temperature. Rare in the limestone valleys.

Cucumber tree (Magnolia acuminata).—Uusually found in rich woods close to streams, also inhabits slopes. In West Virginia and in this State it grows well on the soils of the carboniferous formation. It is light-demanding.

PURPOSE OF THE PLANTING.

It is pre-supposed that persons desiring to plant trees have a definite object in mind. It may be water shed protection alone or only for aesthetic purposes. More often, however, the intention of the owner of the land is to produce wood for one or more of its many uses. If the object in mind is water shed protection alone, practically any species adapted to the site may be used. If for beautifying the landscape, it is usually best to plant a variety of species. But if wood production, lumber, etc., is the main object in mind, the species used must be such as are both adapted to the site and to the use to which the wood is to be put. The following table gives a list of species suitable for different uses. The table includes only those species which it is herein suggested to plant.

TABLE NO. 1. USES TO WHICH THE VARIOUS WOODS MAY BE PUT.

General Lumber.	Paper Pulp.	Cooperage Stock.	Poles and Posts.
Practically all species which have any commercial value are used in different forms of rough or finished lumber.	Spruce. Pine. Larch. Yellow poplar. Carolina poplar. Beech. Hemlock. Maple. Basswood. Douglas fir. Bull pine. Jack pine. Sycamore.	Beech. Chestnut. Maple. Birch. Oak. Red gum. Ash. Elm. Yellow poplar. Basswood. Pine. Spruce. Sycamore.	Chestnut. Honey locust. Black locust. Red oak. Larch.

Mine Timbers.	Railroad Ties.	Hardwood Distillation.
Oaks. Chestnut. Black locust. Honey locust. Pitch pine. European larch. Bull pine.* Jack pine.*	White oak. Red oak. Beech. Black locust. Honey locust. Pitch pine. European larch. Bull pine.* Jack pine.*	Beech. Birch. Sugar maple. Also many other hardwoods.

*Not durable but sometimes used.

LIGHT REQUIREMENTS OF TREES.

Each species of tree has its particular requirement concerning the amount of light necessary to produce the best rate of growth. Certain species cannot survive shade and are known as intolerant or light-demanding species. Others produce satisfactory results under partial shade and are termed tolerant or shade-enduring species. In general, all the species which are advised as suitable for reforesting in Pennsylvania are light-demanding species, with the possible exception of white pine, Norway spruce, black birch, and beech. These species will endure a moderate amount of shade on good soil, particularly Norway spruce and beech.

AGE AND SIZE OF PLANTING STOCK.

The age and size of plants used depend on the type of land to be planted and the species selected. Such factors as accessibility to the planting site, distance from the nursery, and the purpose of the planting must also be considered. The rule is, the larger the seedlings, the greater the planting cost.

Adverse planting conditions require a larger and stronger plant than where conditions are more favorable to success. In order that the planting may be done at the lowest possible cost, the smallest

SEEDLINGS USED IN REFORESTING.

(Arrows point to root collars)

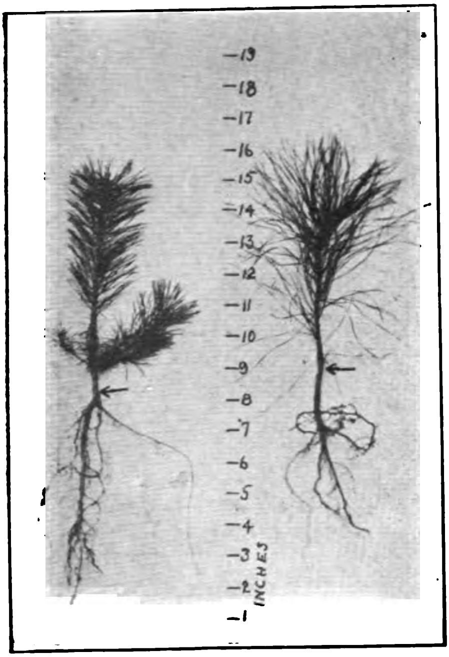


Fig. 5. Pitch pine (left) and Scotch pine (right), two years old.

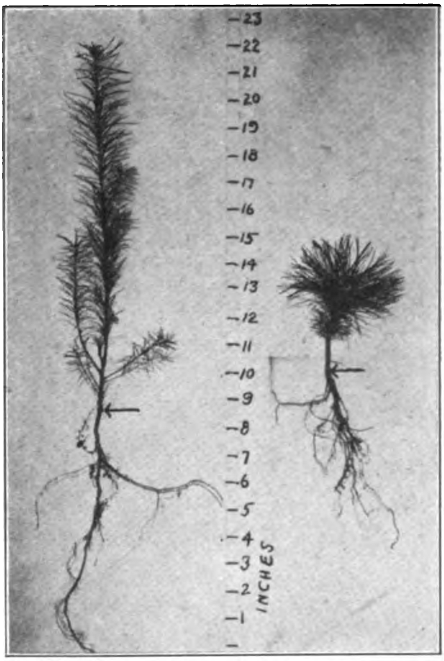


Fig. 6. Japanese larch (left) and white pine (right), two years old.

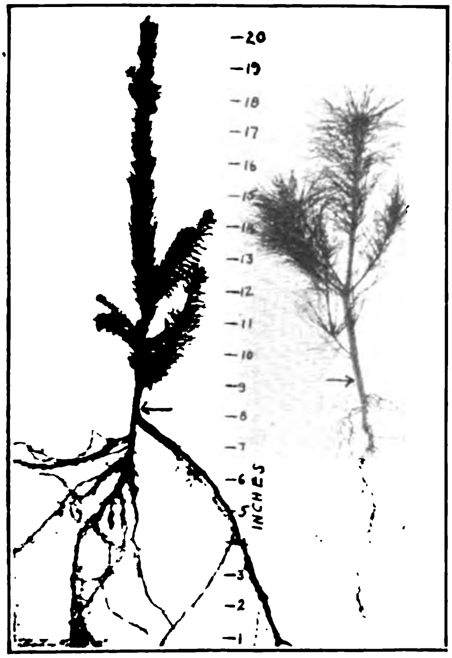


Fig. 7. Norway spruce (left) and white pine (right), three years old.

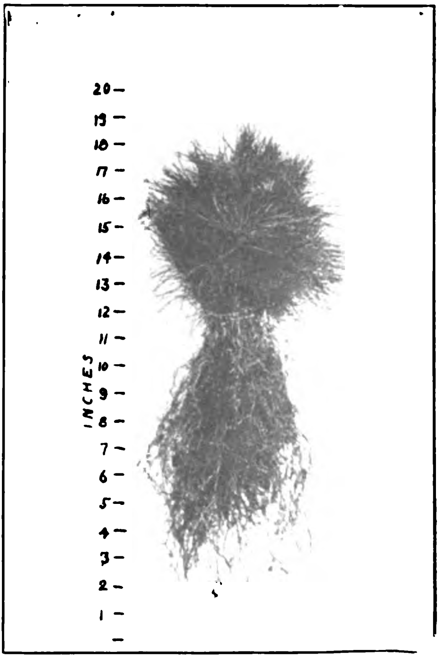


Fig. 8. A bunch of 50 white pine seedlin two years old, ready for packing shipping

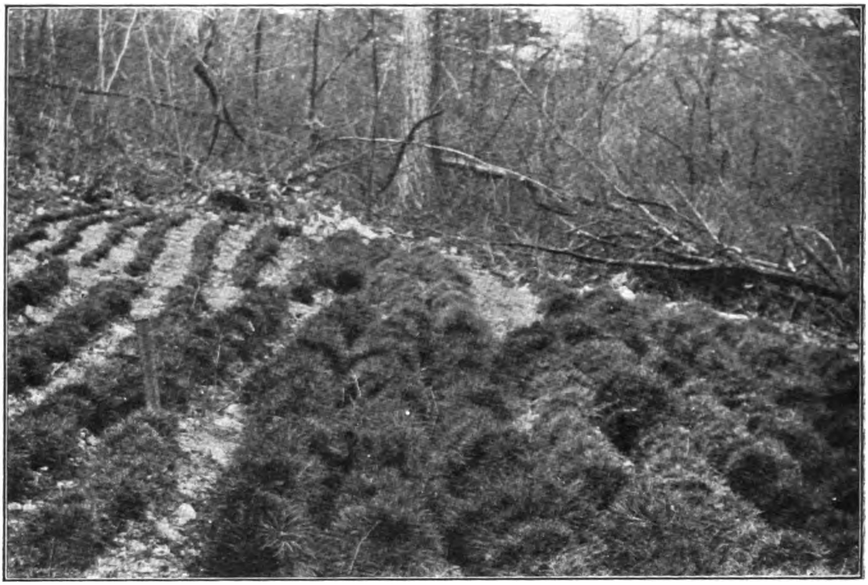


Fig. 9. CARE OF PLANTING STOCK.
25,000 seedlings "heeled in" preparatory to planting.

Photo by Geo. H. Wirt.

Fig. 10. PREPARATION BEFORE PLANTING.
This area was cleared of brush, then planted. It is too expensive to be practical.

seedlings suitable for any particular site should be selected. The layman usually desires quick results and in consequence asks for large plants. Economically considered, this is poor policy because of the increased cost of planting. Also, where too large seedlings are used, the chance of obtaining a good percentage of establishment is lessened unless unusual care is used in the planting.

Broad-leaved species may usually be planted when one year old. If left more than one year in the nursery, providing proper development is obtained, long tap roots result and require pruning. Even one year old broad-leaved species may have to be pruned. This increases the cost of the plantation and reduces the chance of obtaining good establishment. One year old broad-leaved species range in height from 6 to 12 inches above the collar, and the roots frequently are still longer. In 1916, a total of 153,010 hardwood seedlings were planted on State Forests and of this number only 12,000 were other than one year old. These were white ash which had been injured by frost while in the nursery and not of sufficient size at one year to warrant placing them in permanent plantation.

Coniferous plants used for reforesting on State Forests vary in height from 4 to 12 inches and are two or three years old. By far the largest percentage of seedlings used in planting on State Forests have been two year olds. In 1916, a total of 5,339,010 conifers were planted, and of this number 5,255,420 were two year stock.

It is seldom advisable to plant other than two year old pitch pine, Scotch pine, or European larch. White pine two years old is generally large enough. However, if adverse soil, moisture, and shade conditions must be overcome, three year stock, particularly white pine, had better be used. In this State, experience has demonstrated that three year old Norway spruce should be used, for uniformity in size is seldom had in the nursery beds and if taken from the nursery when two years old, a large percentage of the seedlings will be undersized and too small to plant out.

Figures 5, 6, 7, and 8 are from photographs of seedlings two and three years old. Stock such as there shown is used for planting by the Department of Forestry. The scale given represents size of seedlings in inches. Arrows indicate the collar of the plant, which is the point marked by the surface of the ground.

The age of seedlings is reckoned by the number of growing seasons they have passed in the nursery beds. Occasionally seedlings are transplanted in the nursery when one or two years old and are known as transplants. Their age is given as 1-2 years, 2-1 years, etc. The first numeral indicates the number of years in seed beds and the second the number of years in transplant beds. A 1-2 transplant has passed through three growing seasons in the nursery.

TIME TO PLANT.

Reforesting may be done either in spring or fall, preferably spring. Experiments with fall planting have been made on State Forests but gave unsatisfactory results. It was found that a large proportion of the small trees were lifted out of the ground by the following spring. The cause of this was freezing and thawing of the ground before the roots could properly grip the soil. Planting in the spring should be done between the time frost is out of the ground and the time when the buds begin to shoot out the new year's growth. The season in the southern part of the State begins about the last week in March and ends about the last week in April. In the northern part of Pennsylvania the planting season is from one to three weeks later, depending upon altitude.

CARE OF PLANTING STOCK.

Planting stock from State forest nurseries is given careful attention before being shipped. The small trees are lifted from nursery beds in such manner as to do the least possible injury to the roots. This is particularly true of conifers since their roots are more susceptible to permanent injury than those of hardwoods. After lifting, they are counted and tied in bunches of 50 or 100, depending on their size. (See Fig. 8.) The roots of coniferous seedlings are then dipped in a "puddle" of thin mud to prevent drying out. The bunches are then packed in boxes in layers, roots toward the center of the box. Wet sphagnum moss is packed around the roots to keep them moist while in transit. Tops are not moistened.

Shipments of 2,000 or less seedlings are sent by parcel post in paste board boxes. Large shipments are sent by express either in wooden boxes or crates.

Seedlings should never be left in the shipping boxes any longer than necessary, but should be unpacked immediately upon receipt and either planted at once or "heeled in" at or near the planting site.

The number of bundles in the shipment should be counted as removed from the packing boxes and the number of seedlings counted in several bunches. This is to check up the number of seedlings received.

"Heeling in" is done to prevent the roots from drying out. A trench is dug with a spade or plow, deep enough to take care of the roots without crowding. The bundles of seedlings are then taken from shipping boxes, the string cut, and the seedlings spread out along the side of the trench away from the excavated soil with tops above the surface of the ground. (See Fig. 9.) The soil is then pushed into the trench covering the roots and firmed with the foot.

It is best to dip the roots in a "puddle" of thin mud before placing them in the trenches, but keep the tops dry. One bundle of seedlings should be given about six inches of space in the trench.

For "heeling in," select a site close to where the plantation is to be made, and where water is near at hand. It should be partly or wholly under shade but where there is a good circulation of air. The soil should be moist but not wet.

PREPARATION BEFORE PLANTING.

Little previous preparation of the area to be planted is necessary in this State. Occasionally where soil conditions allow, the ground is plowed and harrowed. If this can be done at a nominal cost, say $5 per acre, the plantation may still result in producing a fair rate of interest on the investment. However, such preparation of the area is beneficial only to a comparatively small extent. A large percentage of the planted seedlings may be expected to live and produce a slightly better rate of growth, but this would only be noticeable for a few years after planting. As a rule, it is not advisable.

In other cases, as on scrub oak barrens, all or part of the existing growth is removed and burned. Such clearing of land has been experimented with on State Forests to an extent sufficient to warrant advising against it. (See Figs. 4 and 10). First, the cost of clearing is very high, reaching as much as $50 per acre. This, in itself, makes clearing of the area prohibitive if the plantation is to become financially profitable. Second, it has been found that sprouts from the stumps grow much faster than the planted trees and produce a much denser growth than before clearing. In consequence, the planted trees suffer from lack of sunlight and frequently die.

SPACING.

Various spacing distances for planting are in common use in this State. In most cases an attempt is made to space the seedlings at regular intervals in the rows and the rows are then spaced the same distance apart. This is not always possible, especially in "underplanting," for existing growth prevents regularity. When cleared ground is to be planted, straight rows and regular spacing can be followed.

The number of seedlings required per acre for different spacing distances is shown in the following table.

TABLE NO. 2. NUMBER OF SEEDLINGS PER ACRE WITH DIFFERENT SPACING DISTANCES.

Spacing.	Number per Acre.
3 ft. x 3 ft.,	4,840
4 ft. x 4 ft.,	2,722
5 ft. x 5 ft.,	1,742
6 ft. x 6 ft.,	1,210

Close spacing of trees in plantation is practiced in order that the crowns of the trees may form a closed canopy over the ground in a minimum number of years. The aim is to shade out and kill the lower branches, causing natural pruning to take place. This results in producing lumber comparatively free of knots, also forces height growth of the tree with a minimum amount of taper. Either 4 ft. x 4 ft. or 5 ft. x 5 ft. spacing is recommended for Pennsylvania conditions.

MIXTURE OF SPECIES.

Plantations may be made pure, that is, using one species only, or in mixture, using two or more species in the same plantation. Several different methods of mixing are followed, viz.:

Group mixtures.
Alternating by rows.
Alternating in the rows.

By the group mixture is meant the planting of different species in pure groups, the groups being adjacent to one another, as illustrated by Fig. 1, Plate I.

The method of alternating by rows is illustrated by Fig. 2, Plate I, showing how it may be done when either two or three species are mixed. Fig. 3, Plate I, shows two methods of mixing by alternating in the rows. Innumerable other combinations of mixtures are possible but more or less impracticable. The more complicated the mixture, the greater the cost of planting.

Many factors govern the advisability of planting in mixture. Three of the most important to be considered are:

1. Kind of soil and amount of soil moisture.
2. Light requirements of the species.
3. Rate of growth of the species.

A slow growing intolerant species should not be planted in mixture by the last two described methods, alternate rows or alternating in the rows. But a slow-growing tolerant species may be placed with an intolerant one providing both species are adapted to soil and other conditions of the site to be planted. For instance, white pine and Norway

PLATE I

METHODS OF MIXING SPECIES IN PLANTATIONS.

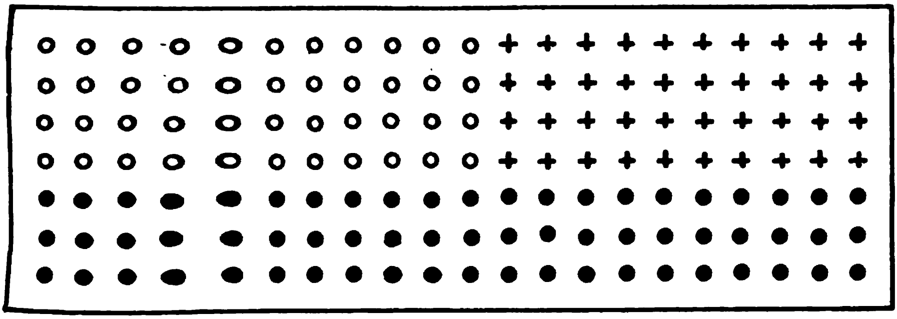
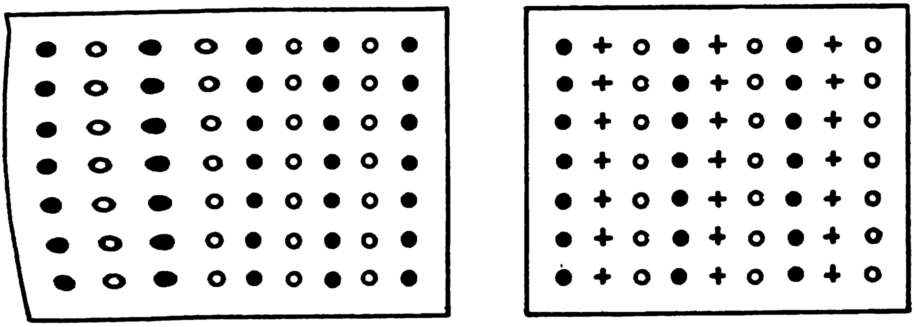


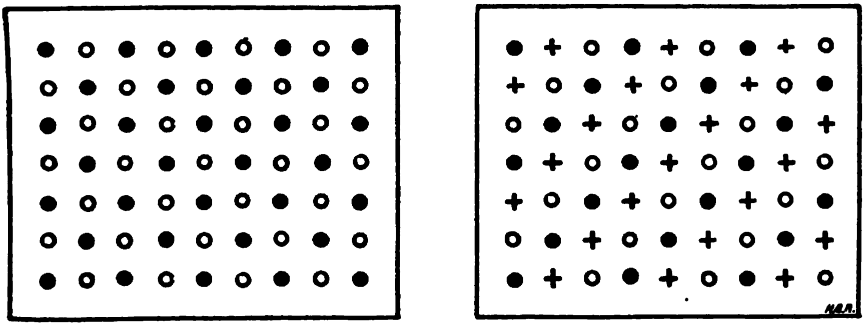
Fig. 1 GROUP MIXTURE.



Using two species.

Using three species.

Fig. 2. ALTERNATING BY ROWS.



Using two species.

Using three species.

Fig. 3. ALTERNATING IN THE ROW.

Symbols represent different species.

DIGGING THE HOLE IN WHICH TO PLANT A SEEDLING.

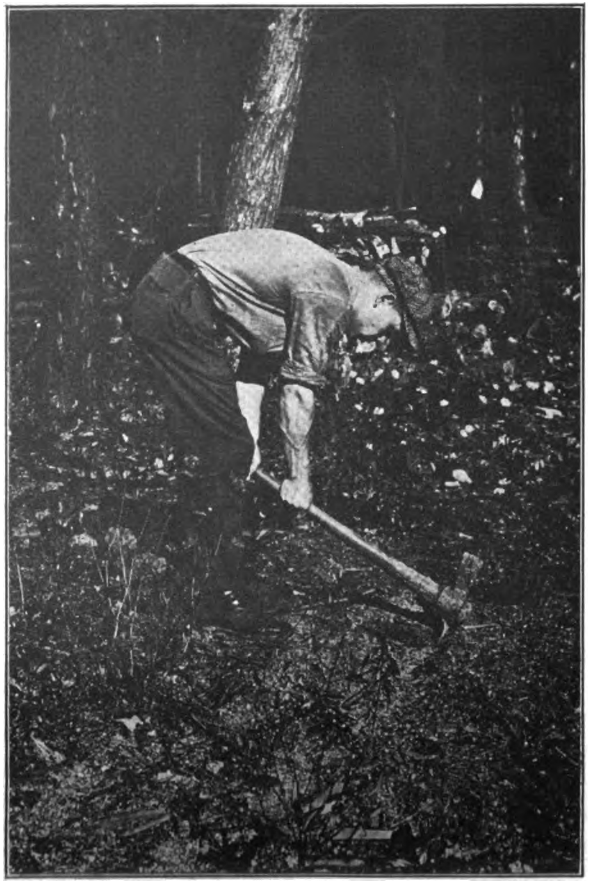


Fig. 11. First stroke with the mattock.

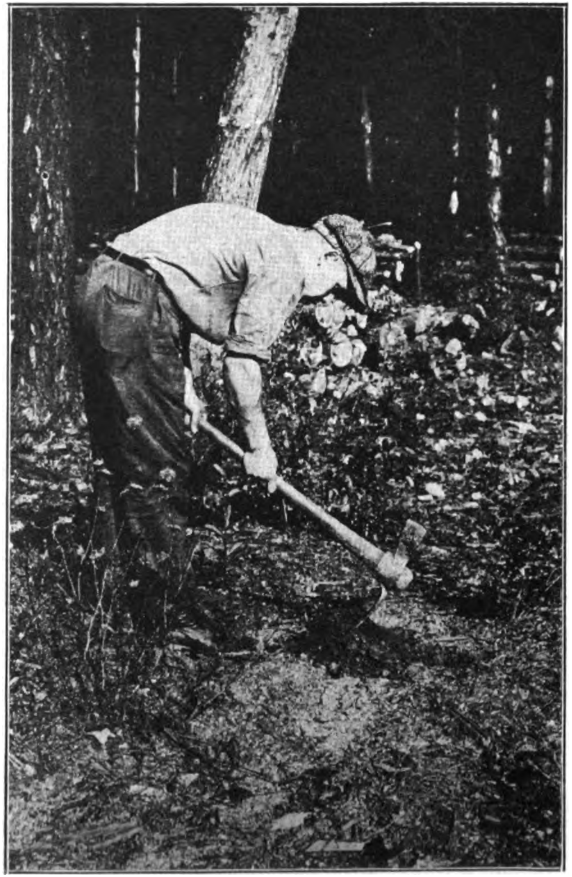


Fig. 12. Removing dirt from the hole.

PLANTING A SEEDLING.

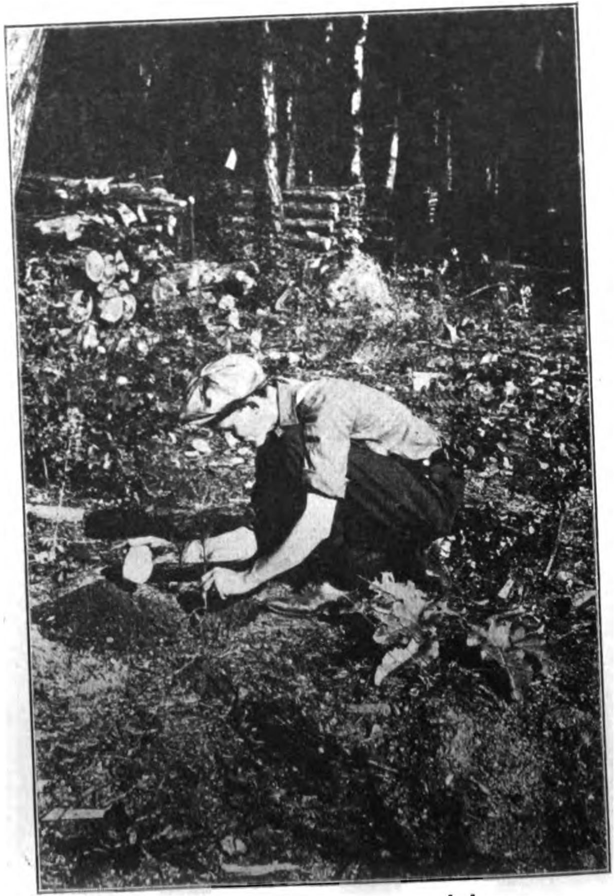


Fig. 13. Placing seedling in the hole.

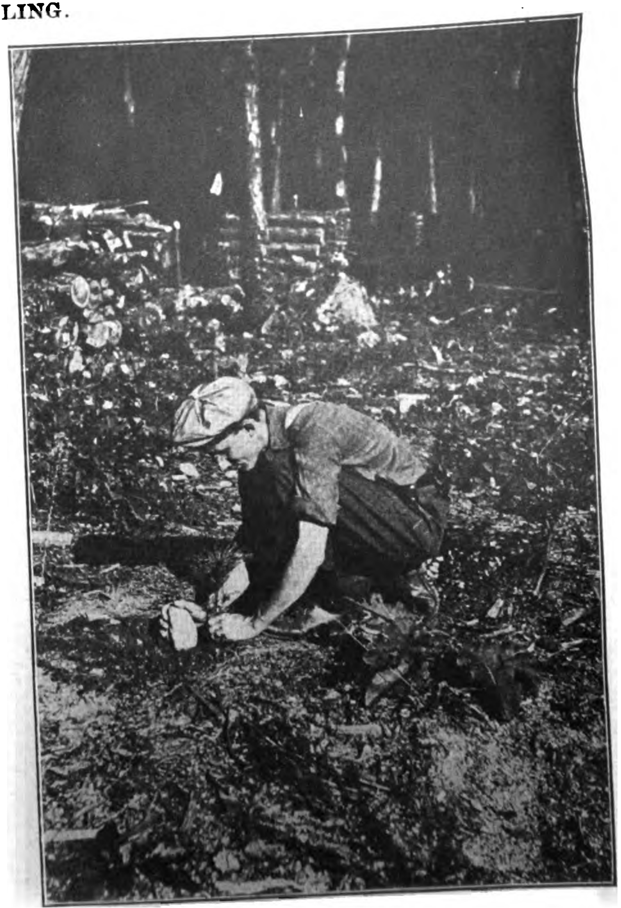


Fig. 14. Tamping soil around roots, using a stone.

PLANTING CREWS AT WORK.

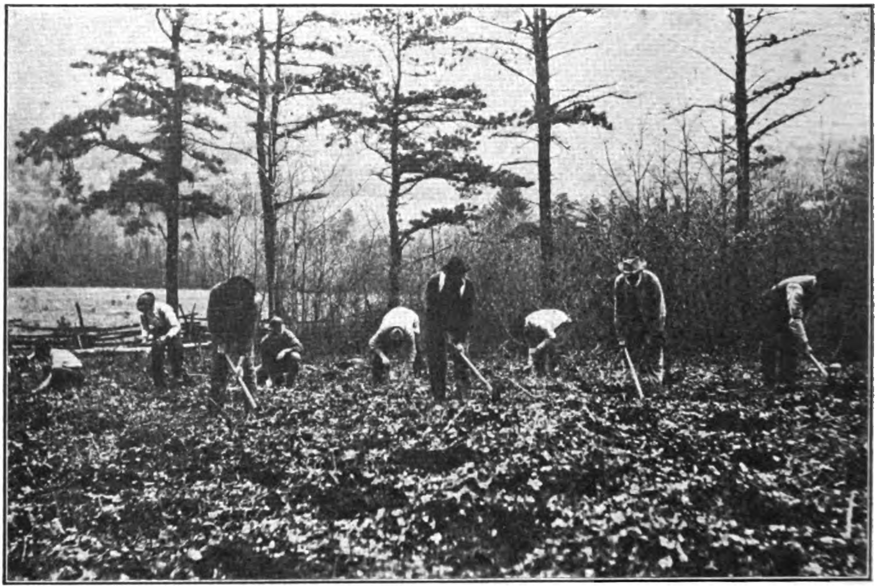


Photo by R. G. Conklin.

Fig. 15. Planting on land cleared of brush.

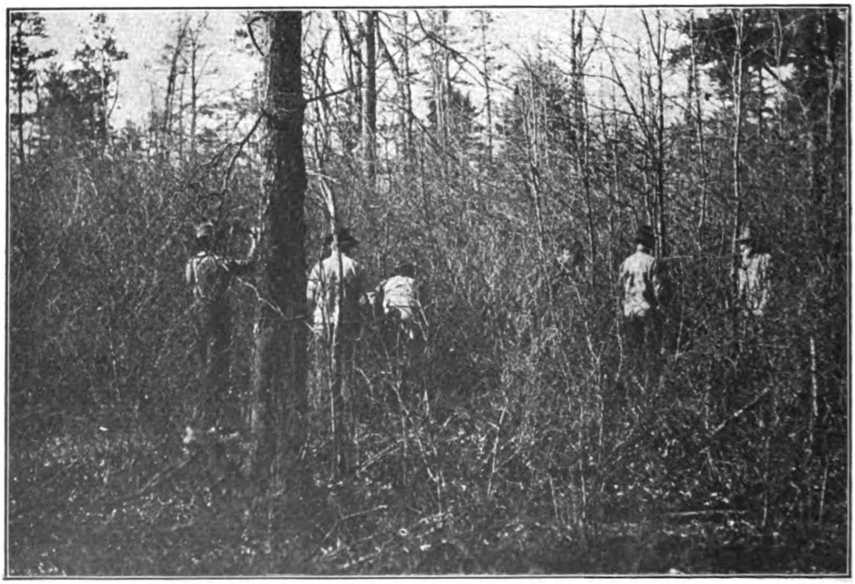


Photo by R. G. Conklin.

Fig. 16. Planting in brush.

spruce may be mixed with practically all of the species herein advised to plant. Where any particular species is subject to injury or destruction by insects or fungous diseases, it is well to plant such species in mixture with other species not liable to attack by that particular insect or fungus. For example, the white pine weevil is doing considerable damage in this State to white pine. In consequence, it is not advisable to plant white pine in pure stands, but it may be mixed with any of the species herein advised to plant.

METHOD OF PLANTING.

Digging the Hole.—The method of planting adaptable to Pennsylvania conditions is to plant the trees in holes dug with a mattock or grubbing hoe. The method of digging the holes most commonly followed is shown by Figs. 11 and 12. The digging end of of the mattock only is required. One stroke is usually sufficient to loosen the soil, and one or more additional strokes to draw the loosened soil from the hole, leaving it in a mound at the edge. Where planting is to be done in heavy sod, two parallel cuts, six or eight inches long and about four inches apart, should be made with the cutting end of the mattock. A third stroke with the digging end of the mattock turns back the sod.

Setting the Seedling.—The tree to be planted is held between the thumb and finger of the left hand at the root collar (See Figs. 5, 6 and 7), and lowered into the hole until the root collar is level with the ground, the roots resting against the side of the hole. The dirt is then drawn back into the hole with the right hand and firmed about the roots either with a planting mallet or stone, or with the foot. (See Figs. 13 and 14.) The following rules should be observed generally in setting the plant.

1. See that the root collar comes about level with the ground.
2. Spread out the roots, putting them as nearly as possible in the position they originally had in the nursery.
3. See that the roots are pointing downward, not bent upward.
4. Have the stem of the plant as nearly erect as possible.
5. See that soil and not vegetable matter (grass, dead leaves, etc.) comes into contact with the roots.
6. Try to bring moist soil into contact with the roots.
7. Firm the soil well around the roots so that the plant cannot easily be pulled out.
8. Keep the roots moist until planted.

The Planting Crew.—The number of men required in the planting crew depends upon the extent of the planting. Experienced men on different classes of land will plant anywhere from 500 to 1,000 seedlings in a day. The better the planting conditions, the greater the number which may be planted per man per day. One man can plant about as fast as another can dig the holes (See Figs. 15 and 16). In consequence the crew is made up of about the same number each of mattock men and planters. As a rule, two experienced men should be provided for each 10,000 seedlings to be planted. If 100,000 seedlings are to be planted, the crew should include ten mattock men and ten planters.

In addition to the mattock men and planters, an additional man or boy is sometimes provided for each five planters. It is his duty to carry the seedlings to the planters and to drop one in each hole. The plants are usually carried in buckets partly filled with thin mud, called "puddle." If there are ten planters, two "droppers" or plant distributors should be provided. One foreman to every twenty men should be charged with the duty of seeing that the seedlings are properly planted.

COST OF PLANTING.

Planting costs vary widely with the many different soil and growth conditions encountered. Where abandoned farm lands are to be planted, the ground may be plowed and harrowed, making planting easy and usually cheaper. Of course, this preparation of the soil, plowing and harrowing, is an item of expense against the planting, but even with this included, the cost should be less than when planting is done where the soil is stony, or where the existing growth is scrub oak, etc.

On Pennsylvania State Forests planting has been done under conditions many and varied, and usually more or less adverse. In all costs herein given for State forest planting, supervision charges are included. The cost of planting per thousand seedlings has varied widely for the different Forests in different years. The first planting on State Forests was done in 1899. Since that time to the end of the year 1915, a total of 16,553,291 seedlings were planted at a cost of $52,919.25, making an average of $3.20 per thousand for planting. For 1915 alone, the average cost was $2.95 per thousand. In that year a total of 4,349,386 seedlings were planted, so this average cost per thousand is a very fair one. The lowest cost was obtained on the Pine Grove Forest where girls and boys were used, the average for planting 141,500 seedlings being $1.28 per M. This was unusually low and is not a fair criterion of cost. Where small plantations, say of only a few thousand seedlings, are made, the cost will run higher than for large ones.

The cost of planting per acre depends also on the spacing which regulates the number of seedlings required per acre. As a rule, either 4 ft. x 4 ft. or 5 ft. x 5 ft. spacing is recommended. Where 4 ft. x 4 ft. spacing is used, 2,722 seedlings are required and the planting cost per acre would be about $8.00. If 5 ft. x 5 ft. spacing is followed, 1,740 seedlings are used and the cost would average about $7.00. But it should not be overlooked that to produce lumber free of knots close planting of the seedlings is required.

The cost of planting, of course, is a factor regulating the financial returns from the investment and to gain the best possible rate of interest on the investment requires the lowest possible cost for making the plantation. However, careful planting must not be sacrificed to keep down the cost a dollar or two per acre. The success of the plantation depends largely on the care given the seedlings before planting and that with which the seedlings are planted.

RATE OF GROWTH.

The rate of growth of planted trees varies widely for different species on different soils and on the different classes of land. Slow growth may be expected on poor soils. However, soils considered too poor for agriculture may be good for wood production. Even though the soil be regarded good for forest trees, if the growth present before planting is bracken or scrub oak, slow growth may be expected until the planted trees are able to overtop the weed species and thus get the advantage of more sunlight (see Fig. 17). On the other hand, on the more open sites, as abandoned farm lands usually are, rapid growth may be expected.

The rate of growth of a number of different species of trees planted on various sites is shown by Tables Nos. 3 to 8 inclusive. These tables were prepared from measurements taken in plantations during the fall of 1916 on Pennsylvania State Forests and on the Jacob Nolde Estate, Berks County, Pa. Average heights are based on measurements of from 100 to 500 trees.

At the head of each column of heights is given a very brief description of the site planted and the age of the planting stock. The "Age of Trees from Seed," given in the first column, is the number of growing seasons through which the trees have passed, including years in the nursery.

The reason for presenting these tables is to give the layman an idea of the rate of growth which he may expect for his plantations. On very favorable sites, a more rapid rate of growth may be counted on than given in the tables. A slower growth rate may be obtained where the plantation is made under more adverse conditions. It will be noted that very slow growth is usually had in plantations the first three to five years after planting, the trees requiring time to adapt themselves to changed conditions. Frequently no appreciable growth whatever is made during the first year or two. When they once become established and overtop brush and weeds, rapid growth, that is, a foot or more a year, may be expected.

TABLE NO. 3. HEIGHT GROWTH OF WHITE PINE (P. STROBUS) IN FOUR DIFFERENT PLANTATIONS.

Age of Trees from Seed (Years).	Description of the Plantations.			
	Mont Alto State Forest. Soil—Sandy loam. Area originally cultivated. Altitude 1600 ft. Aspect—S. E. 2 yr. seedlings planted in 1902, spaced 4'x 4'.	Caledonia State Forest. Soil—shale and loam. Area originally cultivated. Aspect—Western. 2 yr. seedlings planted in 1906, spaced 4'x 4'.	Greenwood State Forest. Soil—rich sandy loam, heavy sod. Area originally cultivated. Altitude 1,000 ft. Aspect — Southern. 2 yr. seedlings planted in 1909, spaced 4'x 4'.	Jacks Mountain State Forest. Soil — dry, very sandy. Brush land, severely burned. Altitude 1,500 ft. Aspect — Northern. 2 yr. seedlings planted in 1909, spaced 4'x 4'.
	Average Heights at End of Year's Growth (feet).			
3	.4	....	....	.2
4	.6	....	1.1	.4
5	1.2	....	1.2	.6
6	1.9	....	1.5	.9
7	2.8	2.2	2.1	1.0
8	4.0	3.6	2.8	1.3
9	5.3	5.3	3.7	1.5
10	6.6	6.7	5.1	1.8
11	7.6	8.0	....	....
12	8.8	9.6	....	....
13	10.1	11.8*	....	....
14	11.3	....	....	....
15	12.3	....	....	....
16	13.5	....	....	....
17	14.9‡	....	....	....

‡Average diameter, 4½ ft. above ground, in 1916, was 2.4 inches. See Figs. 22, 23, 24 and 25.
*Average diameter, 4½ ft. above ground, in 1916, was 1.9 inches.

TABLE NO. 4 HEIGHT GROWTH OF SCOTCH PINE (P. SYLVESTRIS) IN FOUR DIFFERENT PLANTATIONS.

Age of Trees from Seed (Years).	Description of the Plantations.			
	Mont Alto State Forest. Soil—sandy loam. Area originally cultivated. Altitude 900 ft. Aspect—S. E. 2 yr. seedlings planted in 1909, spaced 4'x 4'.	Stone State Forest. Soil — shallow loam. Area grown up with sod and brush. Altitude 1,200 ft. Aspect—N. W. 2 yr. seedlings planted in 1909, spaced 5'x 5'.	Pennypacker State Forest. Soil — blue and red shale. Area originally cultivated. Altitude—1,050 ft. Aspect—S. E. 2 yr. seedlings planted in 1909, spaced 4'x 4'.	Jacks Mountain State Forest. Soil — dry, very sandy. Brush land, severely burned. Altitude 1,500 ft. Aspect — Northern. 2 yr. seedlings panted in 1909, spaced 4'x 4'.
	Average Heights at End of Year's Growth (feet).			
3	.7	.6	....	.5
4	1.0	1.0	1.4	.7
5	1.6	1.7	2.0	1.2
6	2.7	2.7	3.0	1.5
7	4.1	3.7	4.4	1.8
8	6.1	4.9	5.8	2.1
9	8.3	6.4	7.8	2.6
10	10.9	7.8	10.3	3.1

TABLE NO. 5. HEIGHT GROWTH OF PITCH PINE, BULL PINE, AND JACK PINE IN PLANTATIONS.

Age of Trees from Seed (Years).	Description of the Plantations.			
	Pitch Pine (P. rigida).	Bull Pine (P. ponderosa).		Jack Pine (P. Banksiana).
	White Deer State Forest. Soil—sandy. Scrub oak area. Altitude 2,000 ft. Practically level. 2 yr. seedlings planted in 1913, spaced 5'x 5'.	Mont Alto State Forest. Soil—sandy. Area originally cultivated. Altitude 950 ft. Aspect—S. E. 2 yr. seedlings planted in 1908, spaced 5'x 5'.	Jacob Nolde Estate, Reading, Pa. Soil—sandy loam. Area originally cultivated. Altitude 800 ft. Practically level. 2 yr. seedlings planted in 1911, spaced 3½'x 4'.	Jacob Nolde Estate, Reading, Pa. Soil—sandy loam. Area originally cultivated. Altitude 800 ft. Aspect—S. W. 2 yr. seedlings planted in 1910, spaced 3'x 4'.
	Average Heights at End of Year's Growth (feet).			
	.6			
2	.9	.4	.4	....
3	1.5	.7	.7	....
4	2.0	1.1	1.3	....
5	2.4	1.3	2.1	....
6	....	1.8	3.0	....
7	....	2.4	4.3	5.8
8	....	3.0	5.7*	8.0
9	....	3.8	....	10.4‡
10	....	4.5	....	....
11		5.5	....	....

*See Fig. 28.
‡Average diameter, 4½ ft. above ground, was, in 1916, 1.3 inches. See Fig. 27.

TABLE NO. 6. HEIGHT GROWTH OF EUROPEAN LARCH AND JAPANESE LARCH IN PLANTATIONS.

Age of Trees from Seed (Years).	Description of the Plantations.			
	European Larch (Larix decidua).			Japanese Larch (Larix leptolepis).
	Mont Alto State Forest. Soil — moist, sandy loam. Area originally cultivated. Altitude 900 ft. Aspect—S. E. 2 yr. seedlings planted in 1909, spaced 4'x 4'.	Stone State Forest. Soil—dry, sandy loam. Area grown up with brush and sod. Altitude 1,100 ft. 3 yr. seedlings planted in 1910, spaced 4'x 4'.	Austin State Forest. Soil—red shale. Brush land cleared previous to planting. Altitude 1,300 ft. Aspect—S. W. 2 yr. seedlings planted in 1910, spaced 4'x 4'.	Jacob Nolde Estate, Reading, Pa. Soil—deep sandy loam. Area cleared of brush previous to planting. Altitude 700 ft. Aspect—N. E. 2 yr.. seedlings planted in 1909, spaced 3½'x 4'.
	Average Heights at End of Year's Growth (feet).			
3	.5	...	....	....
4	.7	1.0	1.4	....
5	1.2	1.7	1.7	....
6	2.0	2.7	1.9	....
7	2.8	3.8	2.1	....
8	4.9	5.7	3.0	....
9	7.1	8.2	4.6	....
10	9.6	10.4	6.3	16.9*

*Average diameter, 4½ ft. above ground, was, in 1916, 1.6 inches.

TABLE NO. 7. HEIGHT GROWTH OF NORWAY SPRUCE AND DOUGLAS FIR IN PLANTATIONS.

Age of Trees from Seed (Years).	Description of the Plantations.			
	Norway Spruce (Picea Abies).			Douglass Fir (Pseudotsuga taxifolia).
	Austin State Forest. Soil—red shale. Site originally farmed. Cultivated. Altitude 1,300 ft. Aspect—S. E. 3 yr. seedlings planted in 1910, spaced 4'x 4'.	Stone State Forest. Soil—sandy loam. Brush land. Altitude 1,130 ft. Aspect — Northern. 3 yr. seedlings planted in 1910, spaced 5'x 5'.	Jacob Nolde Estate, Reading, Pa. Soil—sandy loam. Brush land, cleared before planting. Altitude 700 ft. Aspect—Eastern. 4 yr. transplants planted in 1909, spaced 3½'x 4'.	Jacob Nolde Estate, Reading, Pa. Soil—sandy loam. Area originally cultivated. Altitude 750 ft. Aspect—N. E. Trees 7 years old transplanted in 1915, spaced 5'x 5'.
	Average Heights at End of Year's Growth (feet).			
2	....	....	....	.7
3	.3	....	....	.8
4	.3	....	....	.9
5	.3	1.3	1.1	1.3
6	.4	1.7	1.3	2.0
7	.7	2.0	1.7	3.0
8	1.0	2.4	2.2	3.2
9	1.3	2.9	2.9	3.7*
10	2.6	3.7	3.9	....
11	....	....	4.9	....
12	....	....	5.9†	....

†See Fig. 30.
*See Fig. 29.

TABLE NO. 8. HEIGHT GROWTH OF WHITE ASH, BLACK WALNUT, AND BLACK CHERRY IN PLANTATIONS.

Age of Trees from Seed (Years).	Description of the Plantations.			
	White Ash (Fraxinus americana).		Black Walnut (Juglans nigra).	Black Cherry (Prunus serotina).
	Stone State Forest. Soil—heavy sandy loam. Area originally cultivated. Altitude 1,140 ft. Aspect—Eastern. 2 yr.. seedlings planted in 1909, spaced 5'x 5'.	Mont Alto State Forest. Soil—sandy loam. Area originally cultivated. Altitude 1,000 ft. Aspect—Eastern. 1 yr. seedlings planted in 1905, spaced 4'x 4'.	Mont Alto State Forest. Soil—sandy loam. Area originally cultivated. Altitude 950 ft. Aspect—Eastern. 1 yr. seedlings planted in 1907, spaced 5'x 5'.	Stone State Forest. Soil—dry shallow sandy loam. Area covered with brush and sod. Altitude—1,140 ft. Aspect—Western. 1 yr. seedlings planted in 1910, spaced 4'x 4'.
	Average Heights at End of Year's Growth (feet).			
1	....	.3	.3	....
2	....	.5	.6	.3
3	.9	.8	.8	.4
4	1.9	1.1	1.2	.5
5	2.9	1.4	1.8	.6
6	4.4	2.0	2.7	.7
7	5.8	2.8	3.5	.9
8	7.9	3.8	4.0	1.6
9	10.4	4.6	4.5	....
10	13.9*	6.1	4.8	....
11	....	7.0	....	....
12	....	7.7	....	....
13	....	8.2	....	....

*Average diameter, 4½ ft. above ground, was, in 1916, 1.5 inches.

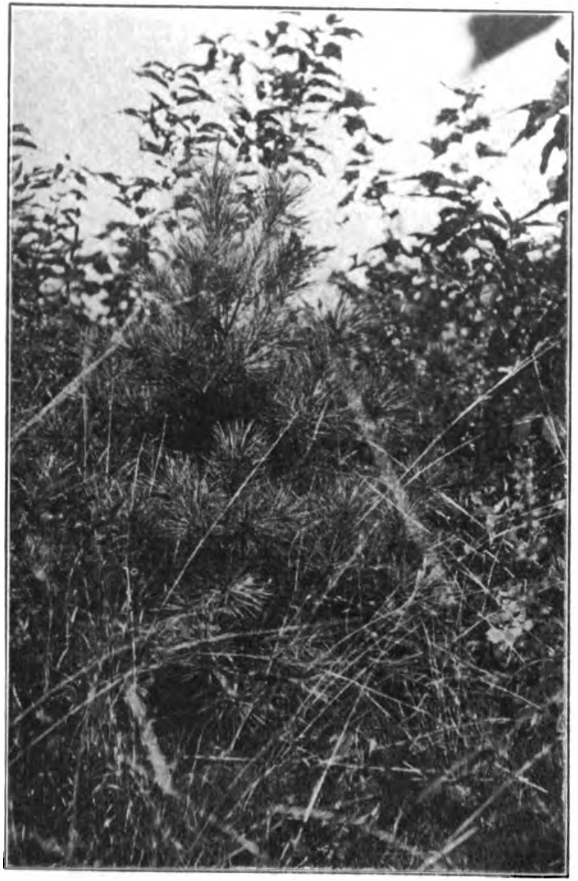


Fig. 17. WHITE PINE PLANTED IN BRACKEN AND SWEET FERN.

Three year old stock was used and four years later the trees were just overtopping weeds and brush. Clearfield State Forest.

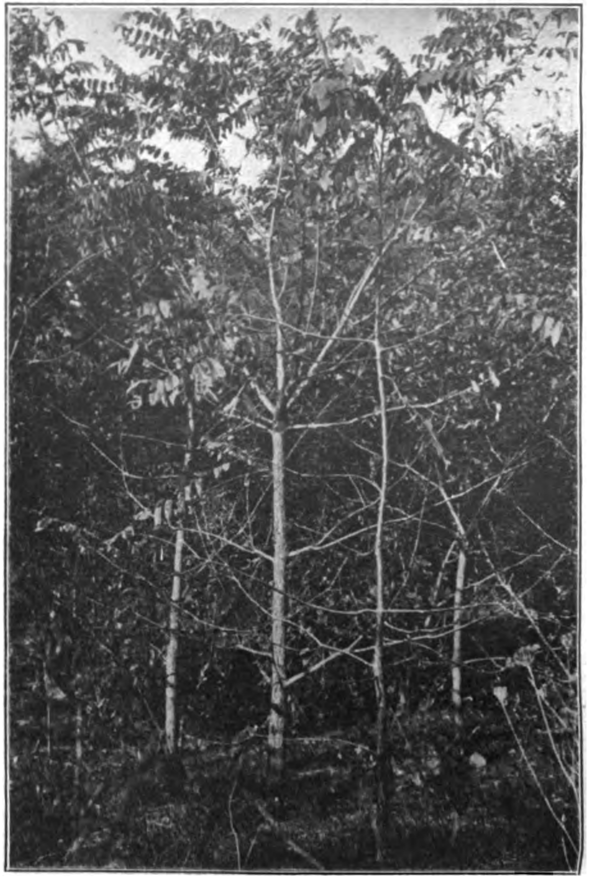


Fig. 18. PLANTATION OF BLACK WALNUT.

Trees ten years old from seed. The plantation was made in 1908, using 1 year stock. Mont Alto State Forest.

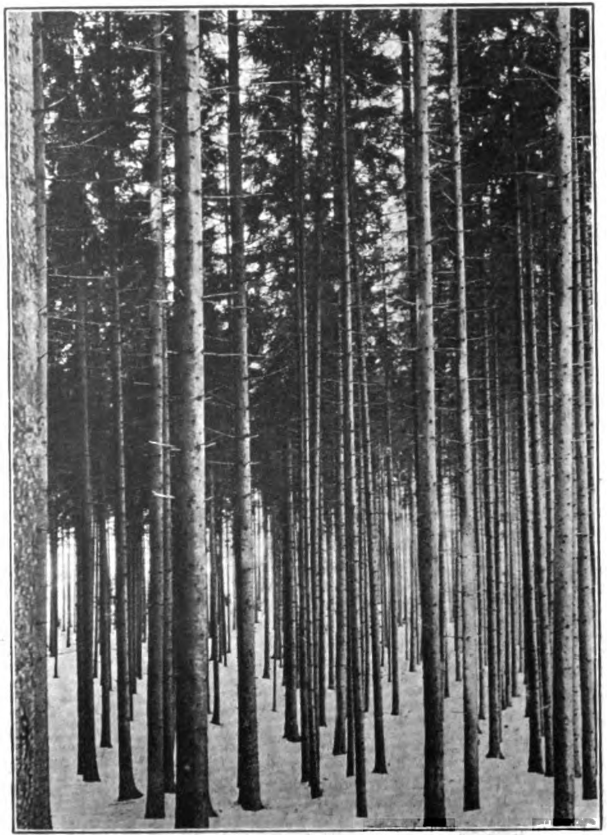


Photo by G. C. Hawkins.

Fig. 19. A NORWAY SPRUCE PLANTATION IN GERMANY.

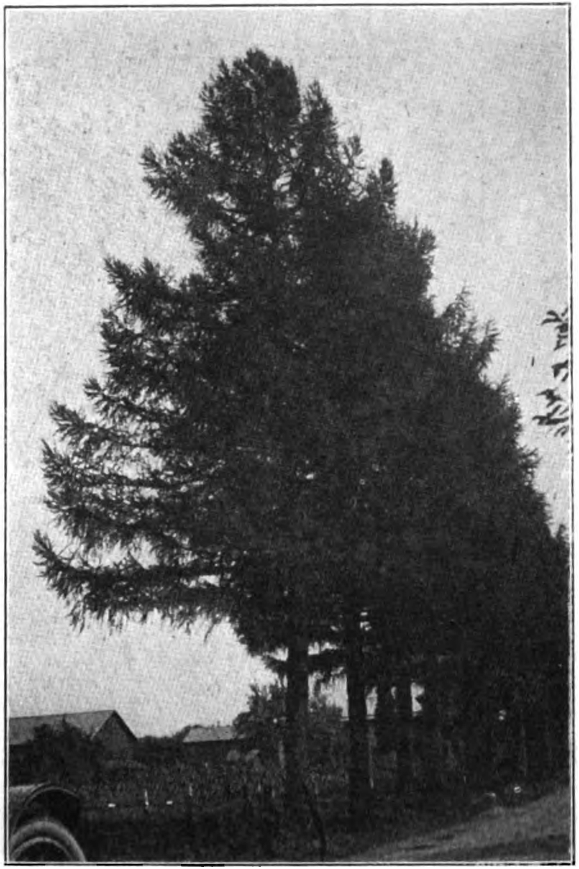


Fig. 20. EUROPEAN LARCH IN PENNSYLVANIA.

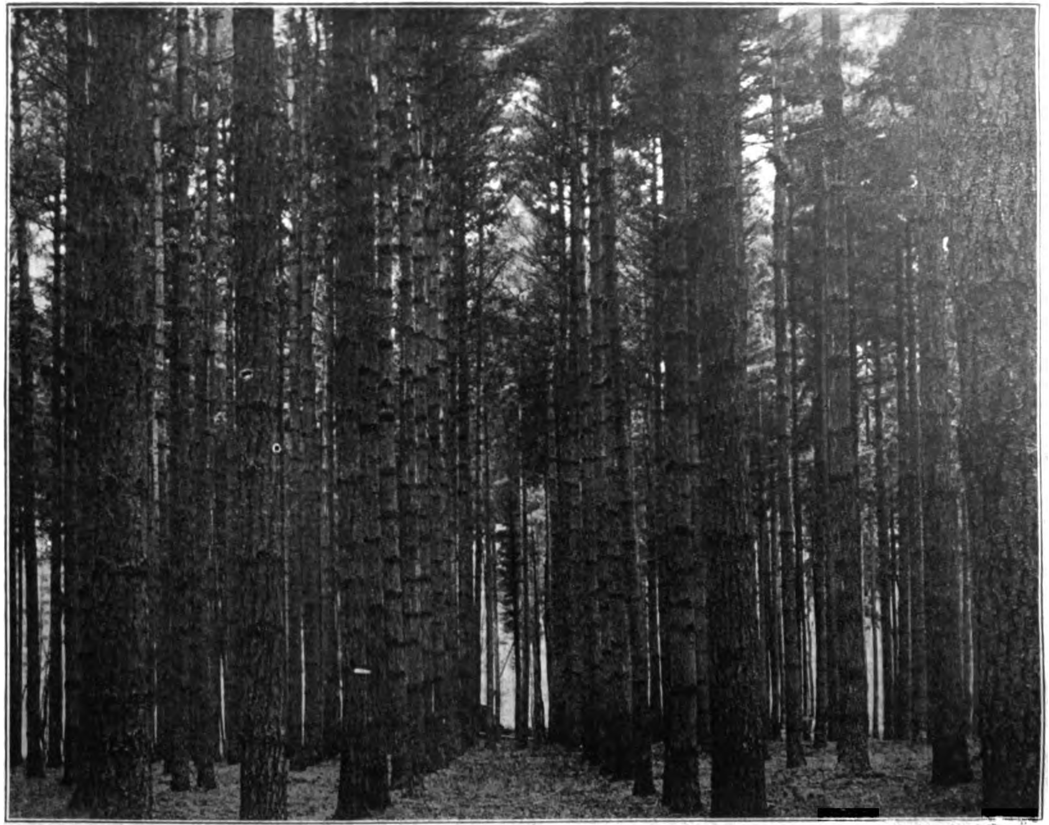


Photo by J. S. Illick.

Fig. 21. WHITE PINE PLANTATION.
Two year old seedlings were used. The trees are 58 years old.

WHITE PINE PLANTATION MADE IN 1902. MONAGHAN FIELD, MONT ALTO STATE FOREST.

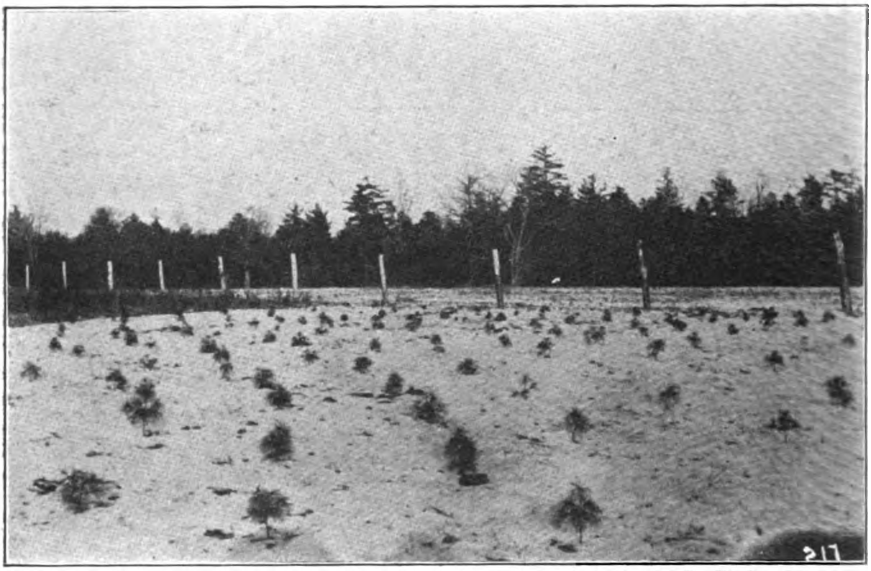


Photo by F. X. Drachbar.

Fig. 22. This picture was taken two years after planting, the trees being four years old from seed. Average height was seven inches.

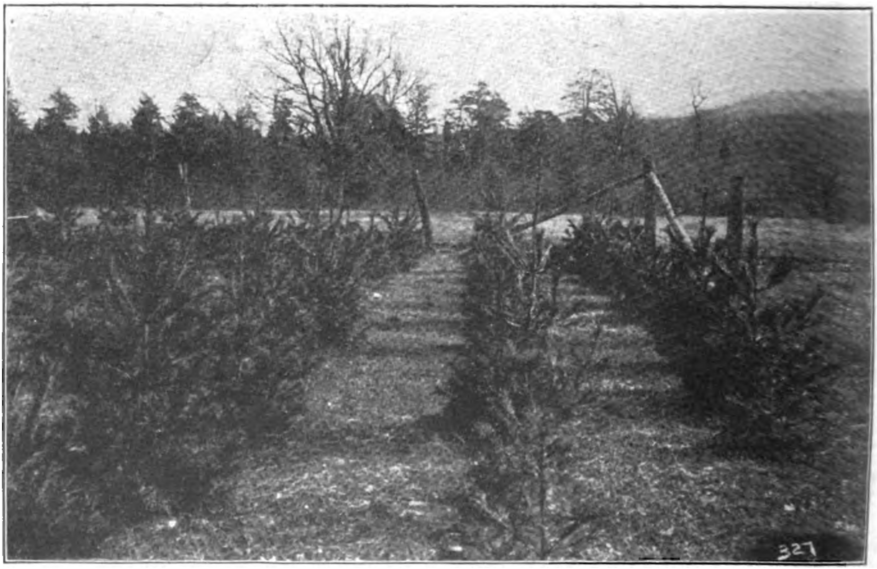


Photo by Dr. J. T. Rothrock.

Fig. 23. This picture shows the plantation six years after planting. The trees were eight years old. Average height four feet.

WHITE PINE PLANTATION. MONAGHAN FIELD, MONT ALTO STATE FOREST.

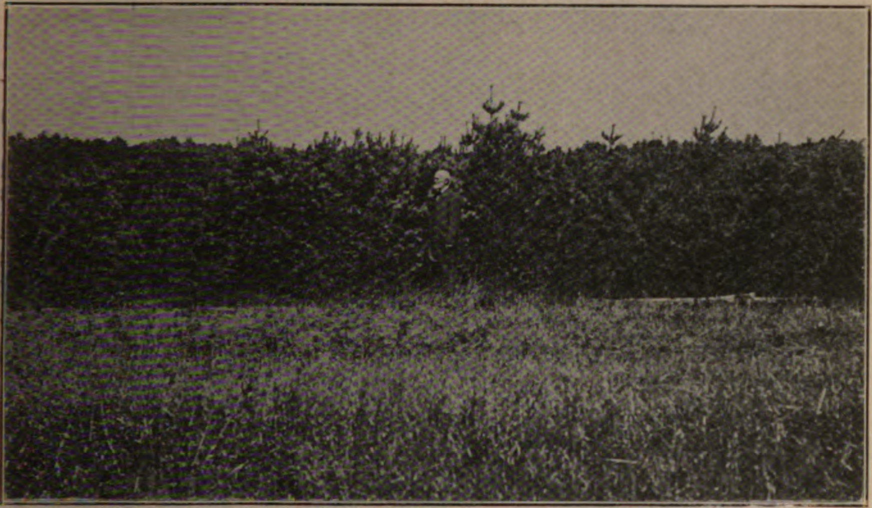


Photo by Geo. H. Wirt.

Fig. 24. When this picture was taken the trees had been planted nine years and were eleven years old. Average height 7.6 feet.

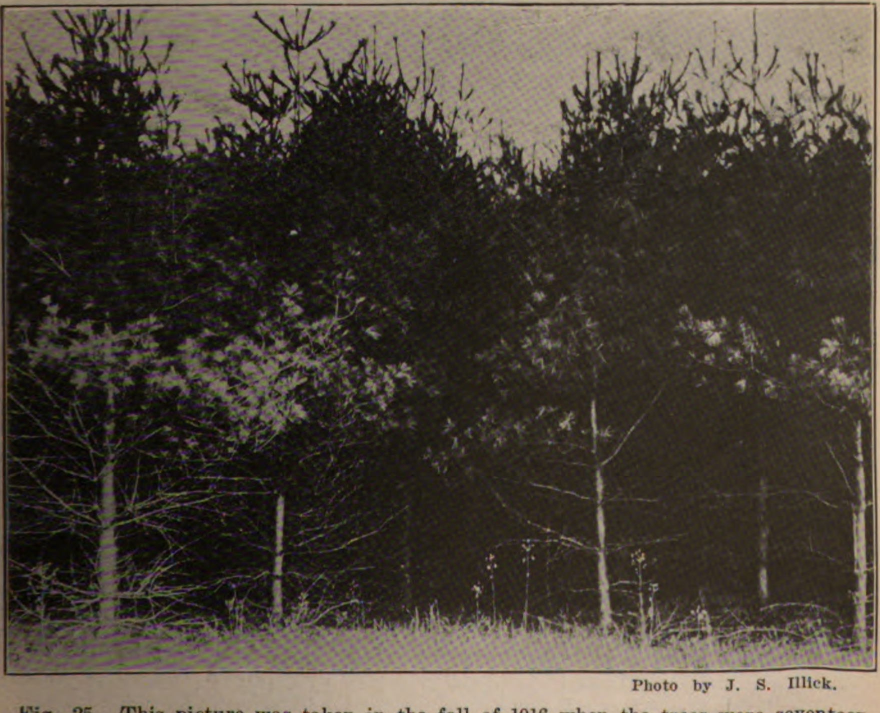


Photo by J. S. Illick.

Fig. 25. This picture was taken in the fall of 1916 when the trees were seventeen years old. The average height of the trees was 14.9 feet and the average diameter, 4½ feet above ground, was 2.4 inches.

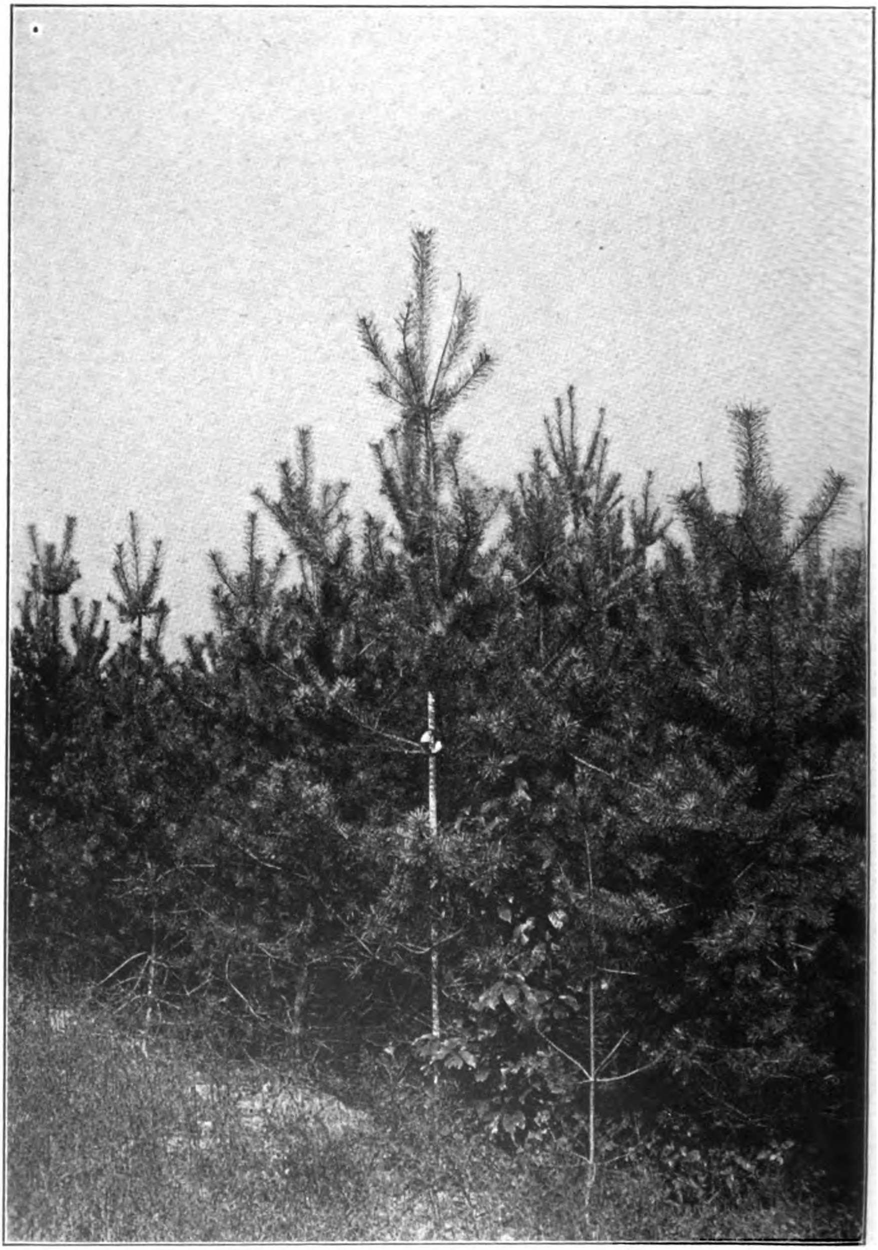


Photo by J. E. McNeal.

Fig. 26. PLANTATION OF SCOTCH PINE.

Trees nine years old from seed. Average height nine feet. Average diameter 1.2 inches. Jacob Nolde Estate, Berks County, Pennsylvania.

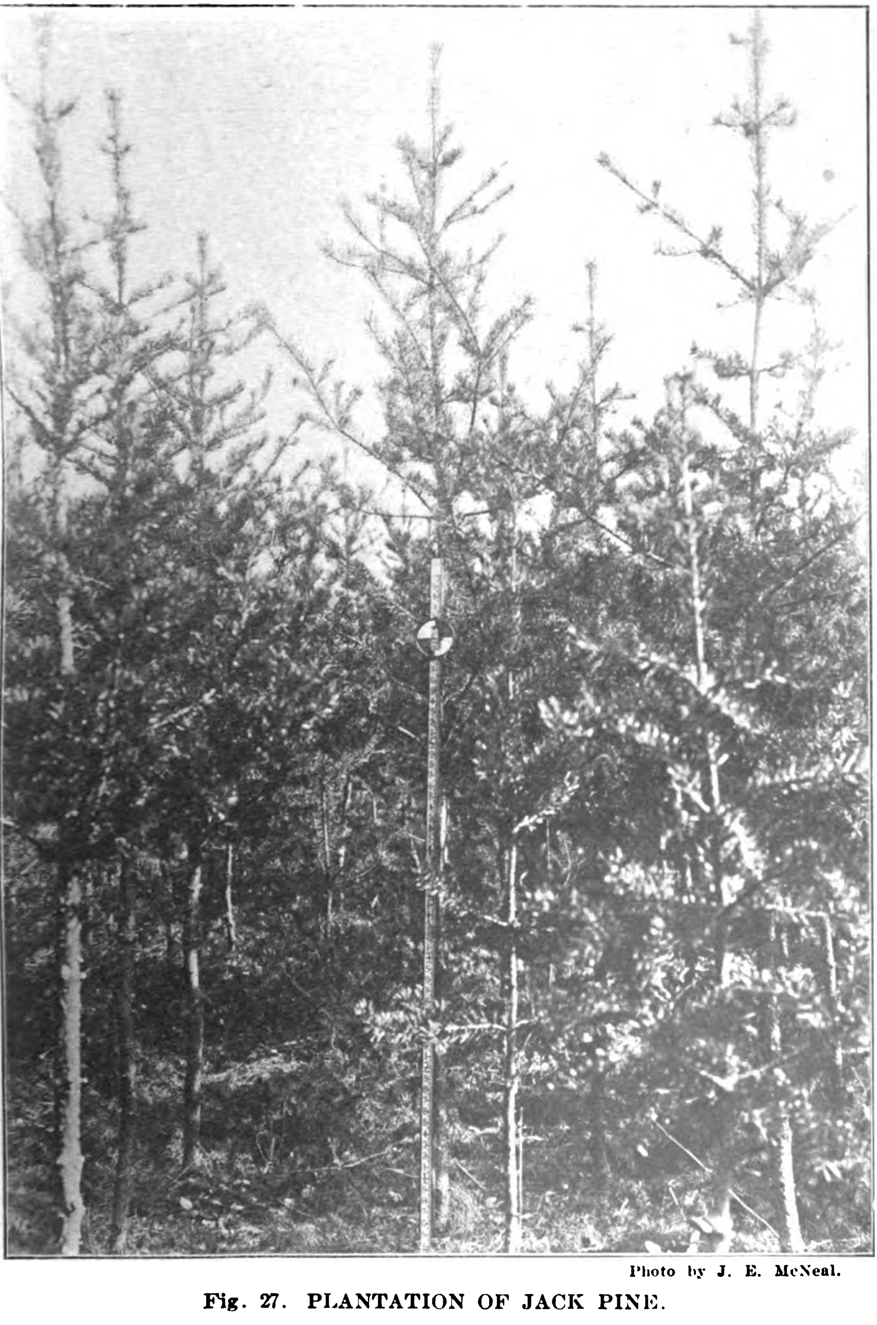


Photo by J. E. McNeal.

Fig. 27. PLANTATION OF JACK PINE.

Trees nine years old. Average height 10.4 feet. Average diameter 1.3 inches.
Jacob Nolde Estate, Berks County, Pennsylvania.

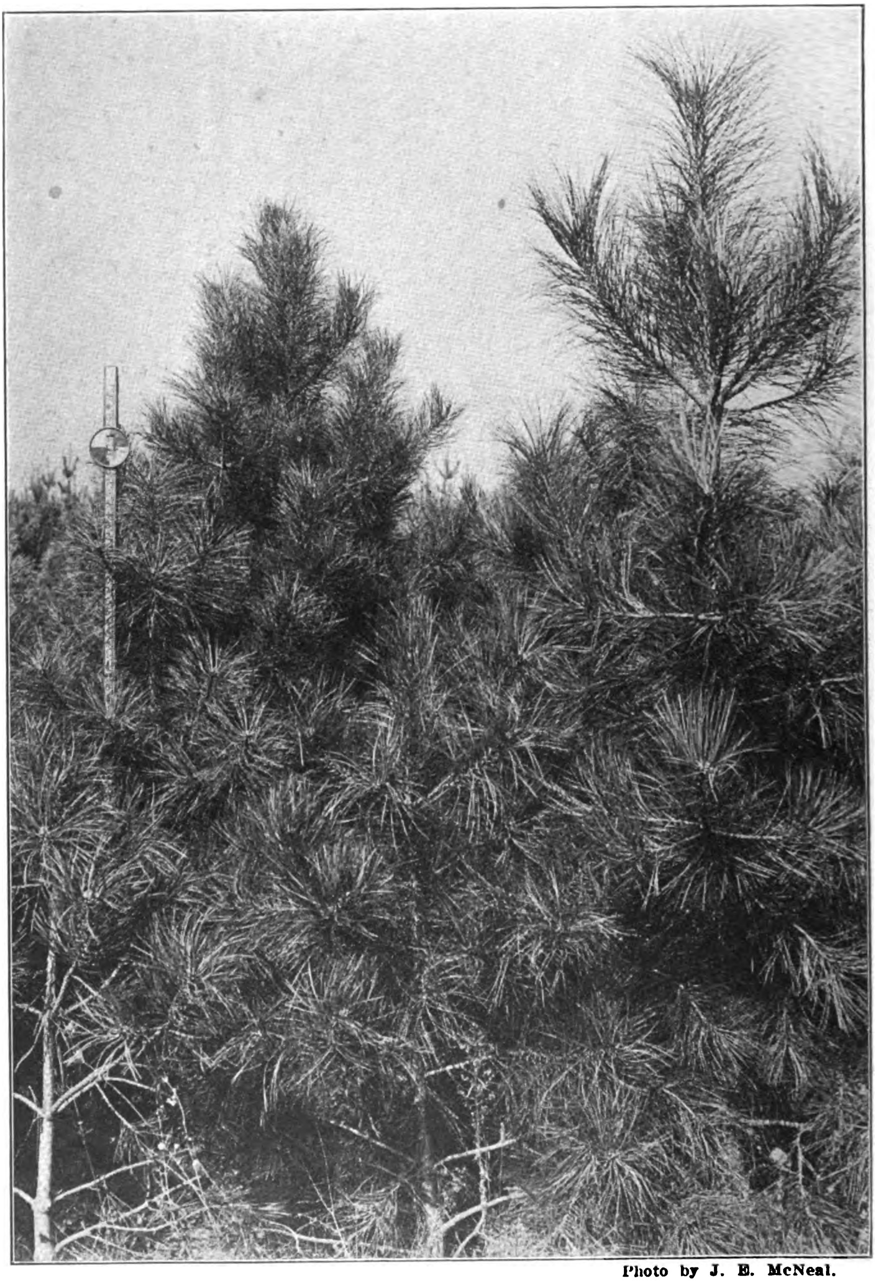


Photo by J. E. McNeal.

Fig. 28. PLANTATION OF BULL PINE.

Trees eight years old. Average height 5.7 feet. Jacob Nolde Estate, Berks County, Pennsylvania.

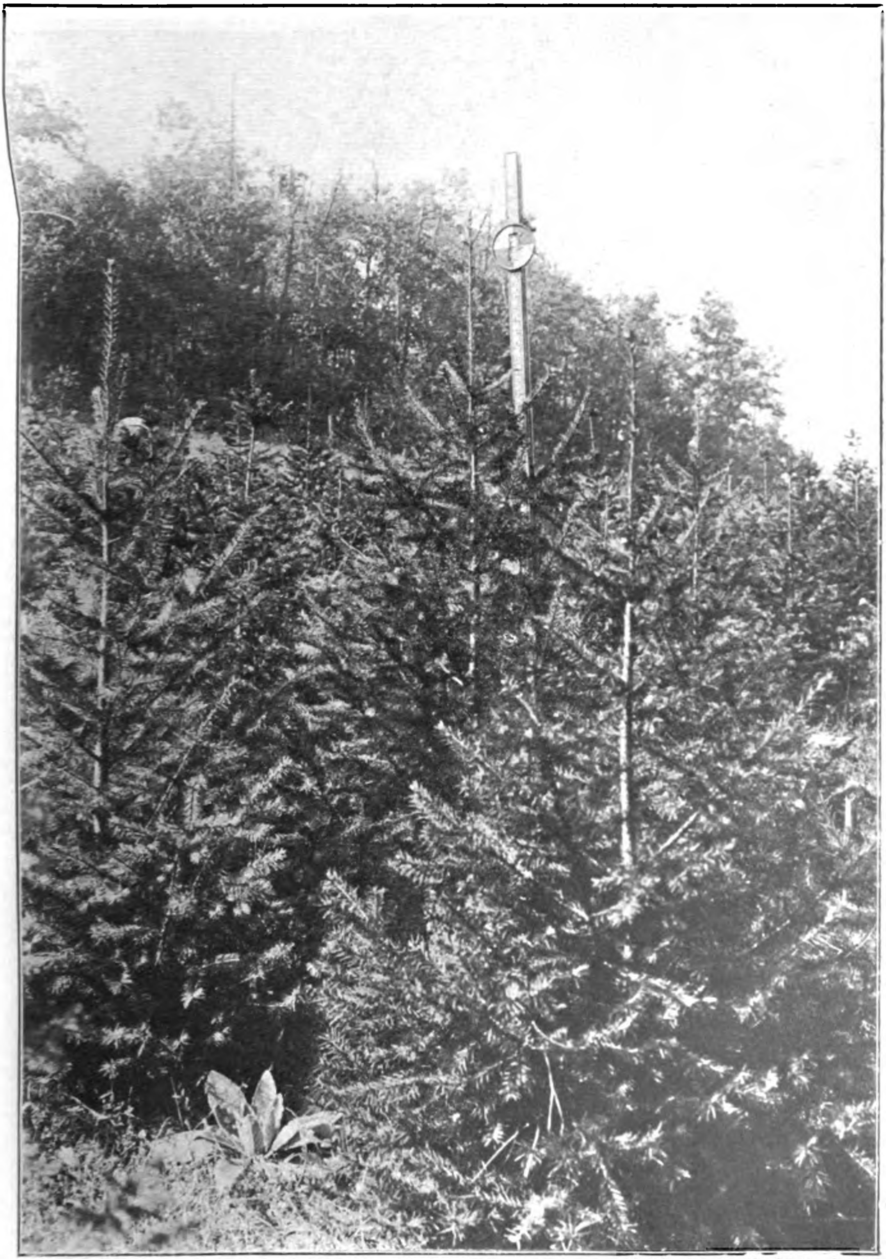


Photo by J. E. McNeal.

Fig. 29. PLANTATION OF DOUGLAS FIR.

Trees nine years old. Average height 3.7 feet. Jacob Nolde Estate, Berks County, Pennsylvania.

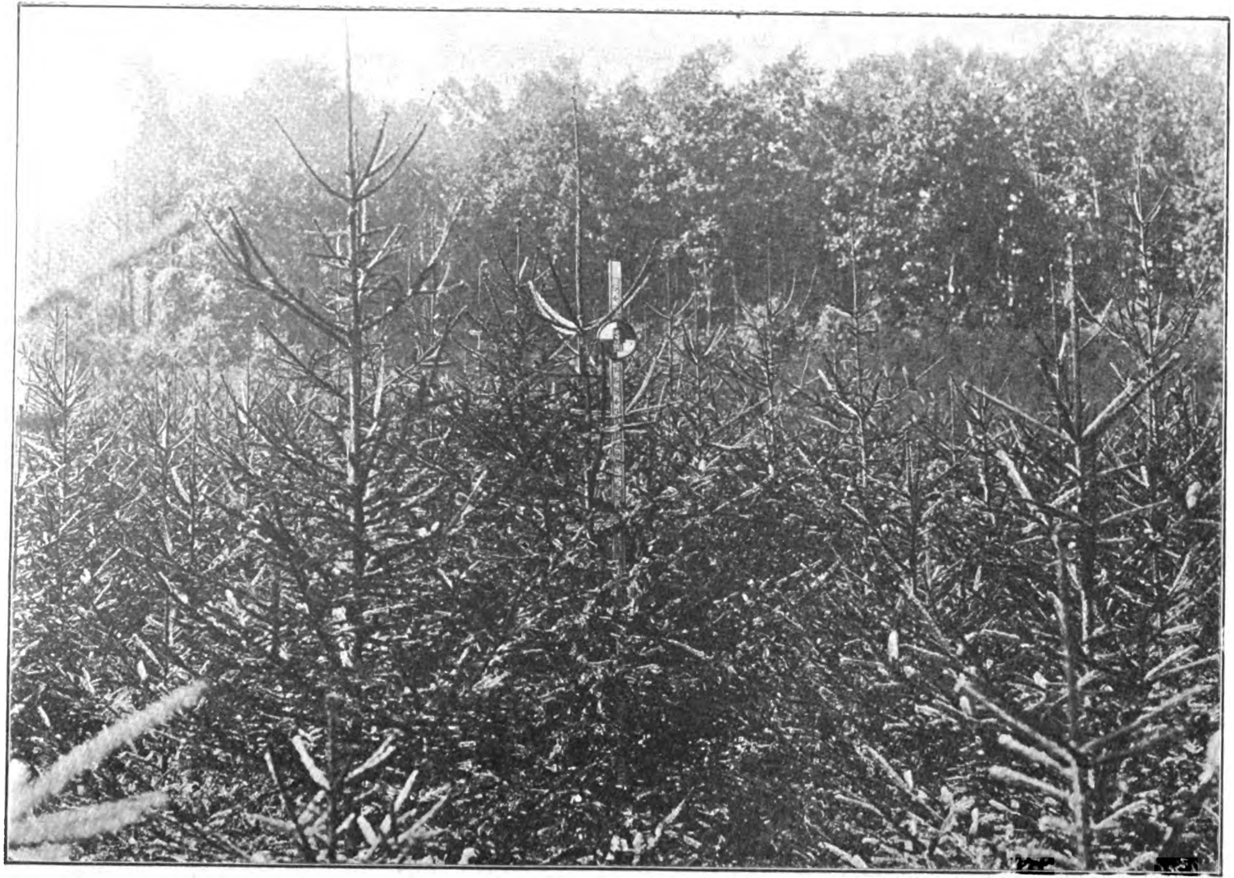


Photo by J. E. McNeal.

Fig. 30. PLANTATION OF NORWAY SPRUCE.

Trees eleven years old. Average height 5.9 feet. Jacob Nolde Estate, Berks County, Pennsylvania.

PROTECTION OF THE PLANTATION.

The success or failure of the plantation is directly dependent on various external dangers which may injure the trees or destroy them entirely, either as a whole, or in part. Among the factors of danger most to be guarded against are:

Fire—First and foremost.
Grazing.
Gnawing animals.
Insects.
Fungi.

Fire.—No reforestation project should be undertaken unless the planting site be so protected that danger of fire is minimized. One fire running over the surface of the ground, feeding on leaf litter and other inflammable debris, means almost certain destruction of the planted trees. The absolute necessity of providing an adequate system of protection from fire cannot be too strongly brought to the attention of the planter. Space here does not warrant going into details of protective measures. They are too voluminous, and, too, each site has its own particular protective necessities. Such information may be obtained by addressing the Bureau of Forest Protection, Department of Forestry, Harrisburg, Pa.

Grazing.—Grazing of cattle over land planted to forest trees should not be permitted, at least not until the trees have reached a height of fifteen to twenty feet. In young plantations, cattle may either eat or trample down the small trees, resulting in the destruction of all or part of the plantation.

Gnawing Animals.—Hardwood plantations in this State have occasionally been damaged by rabbits and mice gnawing the bark and frequently girdling the small tree. Such damages are usually prevalent during severe winters when snow makes other food difficult of access. In coniferous plantations little damage has been reported from this cause.

Insects.—Numerous insects do more or less damage in plantations of all species, both young and old, some attacking the foliage, while others work in the bark or wood of the stems. The work of certain insects results in death to the tree while others do only temporary injury. Special attention is called to the destructive ravages of the white pine weevil (Pissodes strobi) which has been the greatest source of insect damage in white pine plantations in Pennsylvania. This insect works particularly on young white pines, although its activities are not confined to them alone. It is quite common on old trees and has been found in several State forest plantations of Scotch pine and to a more limited extent on Norway spruce.

The adult beetle is about ¼ inch in length, of a reddish brown color, and somewhat mottled with white. The female beetle deposits her eggs in the bark, usually of the terminal shoots, in the spring. The eggs develop into grubs during the month of June. The grubs eat their way obliquely toward the center of the shoot and downward into the pith for a half inch or so. A great many eggs are usually deposited in each shoot and the numerous grubs resulting completely destroy the shoot. Frequently they destroy lateral branches also and sometimes are found in preceding years' growths.

Trees attacked by the weevil cannot easily be detected until after the first few weeks in July, when the shoots begin to wilt and turn brown. Examination of the shoots, by making longitudinal cuts in the shoot, will reveal the plump white grub. White pine and Scotch pine plantations, particularly, should be carefully searched for signs of the weevil about the middle of July and August. All shoots turning, or turned brown, should be cut close to the last whorl of branches and burned. Grubs and partly matured beetles in the shoots are thereby destroyed and their spread checked. Many birds are natural enemies of insects, destroying great numbers of them. Protect the birds and they will help protect the trees.

FUNGI.—Various fungous diseases are found on certain species of trees which it has been suggested to plant. Some do only temporary damage while others cause speedy death to the attacked tree. No attempt will be made to enter into a discussion of the many possible fungous diseases. However, attention of all persons interested in the planting of white pine is called to the white pine blister rust, a fungus which has been brought from Europe on imported nursery stock. Its spread in this country endangers our white pine, and it has been reported in several parts of Pennsylvania but only as isolated infections. A close watch should be kept for this disease to prevent its spread.

This fungus has two hosts, the five needled pines and wild and cultivated currants and gooseberries, upon which it completes its life cycle. On pines, its appearance may be detected by the presence of irregular swellings of the bark. In the spring, from the latter part of April to the middle of June, fruiting bodies appear on these swellings. Whitish blisters, about ⅛ to ¼ of an inch across, first appear, which change to orange color in a few days. By the middle of June, the orange colored postules, which are spores, each one capable of producing the disease, disappear, leaving small rounded hollows on the infected part of the tree. These spores do not infect pines, but attack leaves of currants and gooseberries. Young pines attacked by the blister rust are almost invariably killed, either the first or second year. Old trees may have branches only infected, but usually the infection spreads, finally killing the tree.

The spread of this fungus is impossible unless there are currants and gooseberries upon which it can pass a part of its life cycle. Therefore to check its spread, all currants and gooseberries in the vicinity of the plantation of white pines should be destroyed.

A very complete description of the white pine blister rust is given in Farmers' Bulletin No. 742, U. S. Department of Agriculture. If the presence of the disease is suspected in any part of Pennsylvania, notify the Commissioner of Forestry, Harrisburg, Pa.

All persons interested in reforestation in Pennsylvania who find destructive agencies, such as insects or fungous diseases, working in trees, are requested to bring the matter to the attention of the Commissioner of Forestry. A description of the character and extent of the damage being done should be given. Where possible, a specimen of the infected part of the tree should accompany this information.

PART II.

WHERE AND HOW TO OBTAIN PLANTING STOCK.

Small trees for forest planting may be obtained from the Pennsylvania Department of Forestry. Five large nurseries for the production of forest tree seedlings and transplants are maintained by the Department. In addition, twenty of the State Forests have small nurseries. Trees from these nurseries, over and above what is needed for State forest planting, are furnished to individuals free of charge for private planting in Pennsylvania. This is provided for by an Act of the legislature approved April 21, 1915, as follows:

AN ACT

Authorizing the Department of Forestry to grow and distribute young forest trees, and restricting their use after distribution.

Section I. Be it enacted, &c., That the Department of Forestry is hereby authorized to grow young forest trees, and to distribute them to those desiring to plant them, in such quantity and under such regulations as may be prescribed by the Department, when the available stock in the forest nurseries shall be in excess of that required by the Department for forest planting. No charge shall be made for the trees so distributed, but the cost of boxing and shipping shall be paid by the applicant. The applicant must enter into an agreement with the Department to plant the young trees under such conditions or regulations as may be made by the Department, and to protect and care for them when planted. The Department may render such assistance and instruction in the planting of the trees as it may deem necessary to secure their proper planting.

Section 2. That all such young forest trees, which shall be distributed as aforesaid, shall not be subject to sale in the hands of the applicant, but shall be properly planted, in accordance with the agreement entered into with the Department.

Section 3. That all acts and parts of acts inconsistent with or supplied by this act are repealed.

Approved—The 21st day of April, A. D. 1915.

MARTIN G. BRUMBAUGH.

The annual production from State owned nurseries is 6,000,000 to 8,000,000 seedlings and transplants. In 1916, a total of 6,946,295 were removed from State nurseries, of which 1,454,275 were given to individuals in the State.

The stock grown in these nurseries is not suitable for purely ornamental planting, and applications for trees for this purpose will not be granted. They are grown for, and are to be used only for afforestation, and this only within the State.

HOW TO OBTAIN PLANTING STOCK.

Forest tree seedlings and transplants can be furnished from any one of the State owned nurseries.

Persons who own waste land in Pennsylvania and who desire to reforest it, should report to the Department of Forestry at Harrisburg, or to the nearest State Forester named below.

James E. McNeal, Distict Forester, No. 616 Washington St., Reading, Berks county. Mr. McNeal's district includes Berks, southern Carbon, Lehigh, Northampton, and Schuylkill counties.

R. Lynn Emerick, District Forester, Coudersport, Potter county. Mr. Emerick's district includes Potter and McKean counties.

Walter D. Ludwig, District Forester, care of Chamber of Commerce, Johnstown, Cambria county. Mr. Ludwig's territory includes Cambria, Blair, and Indiana counties.

Wm. F. Dague, District Forester, Clearfield, Clearfield county. Mr. Dague has charge of Clearfield county interests.

John L. Strobeck, District Forester, Analomink R. F. D., Monroe county. Mr. Strobeck's territory includes Monroe, northern Carbon, and parts of Lackawanna and Wayne counties.

John E. Avery, Notch, Pike county.
L. G. Barnes, Box 33, Centre Hall, Centre county.
W. J. Bartschat, Troxelville, Snyder county.
Chas. E. Baer, Elimsport, Lycoming county.
John A. Bastian, Loyalsock, Lycoming county.
V. M. Bearer, Ligonier, Westmoreland county.

CLEARFIELD STATE FOREST NURSERY.

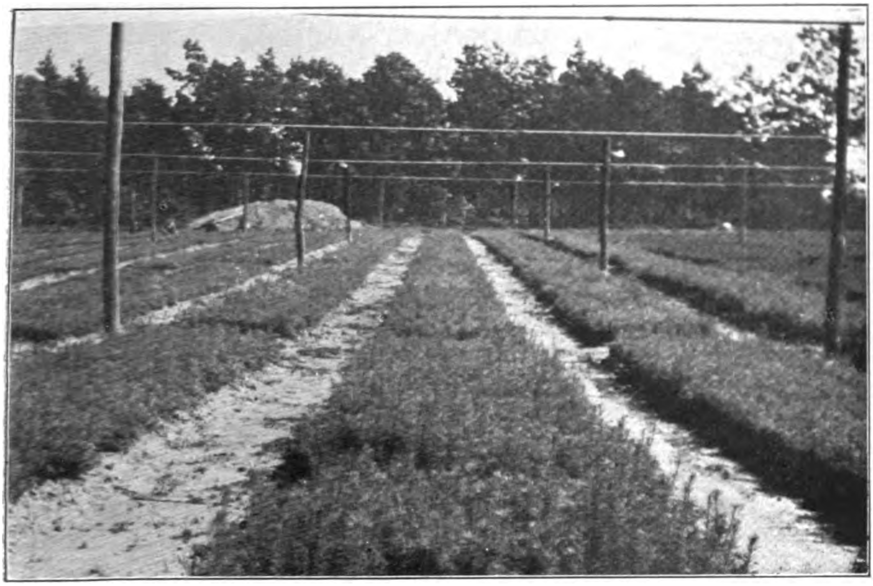


Fig. 31. These beds contain thousands of seedlings. European larch, two years old.

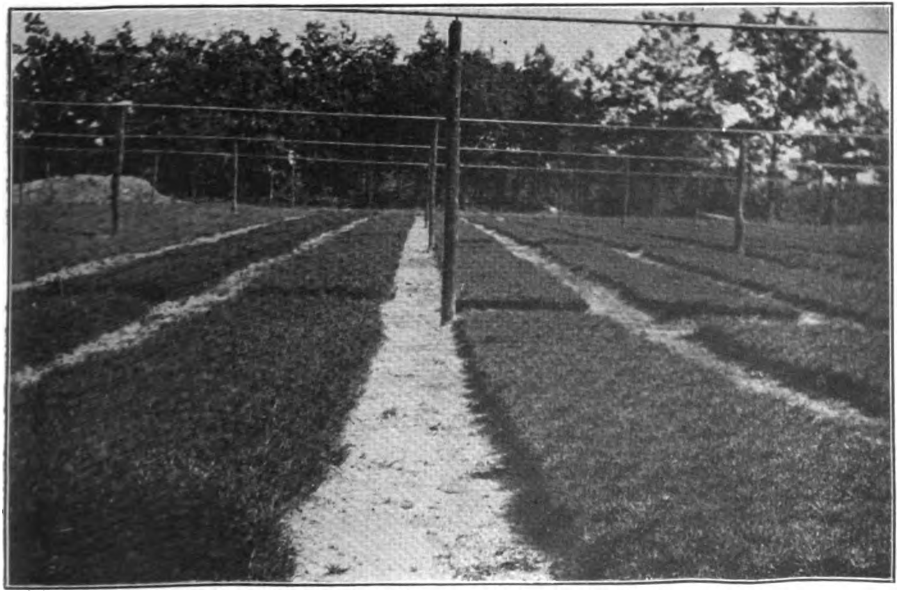


Fig. 32. Pitch pine, two years old. To be removed from the beds in the spring and planted in their final location.

Tom O. Bietsch, McAlevysfort R. F. D. No. 1, Huntingdon county.
Joe R. Blouse, Glen Union, Clinton county.
A. W. Bodine, Mount Union R. F. D., Huntingdon county.
H. E. Bryner, New Germantown, Perry county.
Wm. L. Byers, Rainsburg, Bedford county.
Robert G. Conklin, Fayetteville, Franklin county.
H. F. Critchley, North Bend, Clinton county.
F. H. Dutlinger, Westport, Clinton county.
Harry E. Elliott, Sinnamahoning, Cameron county.
W. B. Evans, Sizerville, Cameron county.
P. Hartman Fox, Austin, Potter county.
Thos. H. Golden, Crossfork, Potter county.
Thos. C. Harbeson, Lloyd, Tioga county.
J. R. Hogentogler, Loganton R. F. D. No. 2, Clinton county.
W. H. Horning, Karthaus, Clearfield county.
J. S. Illick, Mont Alto, Franklin county.
John W. Keller, Boalsburg, Centre county.
Carl L. Kirk, Penfield, Clearfield county.
Chas. R. Meek, Coburn, Centre county.
Homer S. Metzger, Loganton R. F. D. No. 1, Clinton county.
W. E. Montgomery, Spring Mills R. F. D. No. 1, Centre county.
Howard H. Morgan, Slate Run, Lycoming county.
T. Roy Morton, Petersburg, Huntingdon county.
Marvin H. Moyer, Slate Run, Lycoming county.
Paul H. Mulford, Asaph, Tioga county.
Max E. Müller, Hammersleyfork, Clinton county.
Robert R. Neefe, Waterville, Lycoming county.
Geo. S. Perry, Aitch, Huntingdon county.
Geo. A. Retan, Mont Alto, Franklin county.
Alfred E. Rupp, Fort Loudon, Franklin county.
J. B. Ryon, Sinnamahoning, Cameron county.
Geo. W. Sheeler, Snow Shoe, Centre county.
A. C. Silvius, Laurelton, Union county.
H. A. Smith, East Waterford, Juniata county.
Robert W. Stadden, Greentown, Pike county.
Lewis E. Staley, Mont Alto, Franklin county.
H. C. Van Horn, Conrad, Potter county.
D. Kerr Warfield, Milroy, Mifflin county.
A. B. Wells, Fields Station, Lycoming county.
John R. Williams, Pine Grove Furnace, Cumberland county.
Raymond B. Winter, Mifflinburg, R. F. D., Union county.
Chas. E. Zerby, Medix Run, Elk county.

Blank forms for making application for seedlings and transplants will, on request, be furnished by the Department of Forestry, or by any one of the above named foresters. The application, properly filled out, must be forwarded to the Department of Forestry, Harrisburg. Foresters and nurserymen are not invested with the right to grant free distribution of planting stock. This may be done only by the Commissioner of Forestry.

ADVICE AND EXAMINATION.

Extensive planting operations should not be undertaken by the layman without receiving advice from a competent person trained in the theory and practice of forestry. Reforesting costs money, and a mistake in judgment as to what and how to plant may mean complete failure of the plantation and a heavy loss in money and time. A trained forester cannot guarantee the success of a plantation, for failure sometimes occurs from no apparent cause, or as the result of insect and fungous attacks. However, it is indisputable that reliance on a forester's knowledge presupposes the planting of the best species for the site and, therefore, the best chance of success.

The Department of Forestry is willing to give all possible assistance to individuals in planting operations. Where it is proposed to plant up areas of considerable size, the Department will make every effort to have one of its foresters make an examination of the area to be planted, and do this free of charge. The forester will then make a report to the Department on his examination, suggest the species it is proposed to plant, and furnish a planting plan to be followed. He will also give the individual what advice he can on how best to plant, the number of men necessary to do the planting, and how to organize the crew.

Since the Department of Forestry has only a limited number of foresters available for making examinations, application for examinations and advice should be made at least three months before the planting season. In districts where there is a district forester, he should first be consulted for advice, since the matter will be referred to him.

WHAT IS REQUIRED OF THE RECIPIENT.

In return for receiving seedlings from the Department of Forestry, all persons are required to pay the cost of packing and transportation, and furnish reports requested of them. The seedlings will be shipped from one of the State nurseries. About four days previous to shipment, the nurseryman will inform the applicant of the date of shipment. On the day of shipping, he will mail two blank forms which must be filled in. One is to be used to acknowledge receipt of the nursery stock (B. of S. & M. Form 52, "Nursery Stock Receipt"). The other is for making report on the planting of the seedlings (B, of S. & M. Form 34-B, "Plantation Report for Private Planting").

Nursery Stock Receipt.—On receipt of the shipment, the packing box should be examined. Then several bundles of seedlings should be opened and the number of seedlings in the bundles counted. It will be found that the bundles contain 50, 75, or 100. Occasionally a few extra seedlings of small size are in the bundles. These should not be considered. After determining the number in each bundle, "heel in" all seedlings, counting the number of bundles as this is done. The total number of seedlings received is then known.

The blank form, "Nursery Stock Receipt", should be filled out immediately and mailed to the Commissioner of Forestry, Harrisburg. Make note thereon of the condition of the packing box and the number of seedlings received, and their condition.

Nursery Charge.—The amount of the charge for packing and shipping will be supplied by the nurseryman. As a rule, the packing and hauling to point of shipment averages about 25c per thousand seedlings. Transportation by mail or express averages about 20c per thousand. If sent prepaid, this cost will be included in the amount of the charge sent by the nurseryman. This amount is to be remitted to the Commissioner of Forestry and should accompany the "Nursery Stock Receipt." Remittance may be made by postage stamps if it amounts to less than 50c. If the charge is 50c or over, remittance should be made by check or postal money order.

Plantation Report for Private Planting.—Directly after the seedlings are planted, the blank form provided for this purpose is to be filled out and mailed to the Commissioner of Forestry, Harrisburg. It is imperative that no delay in planting take place and that the report be submitted promptly.

The matter of making full and complete report is important and requires careful attention. Keep account of all costs incurred, including drayage from station to planting site, hired labor, and the number of hours devoted to planting by salaried employees. Calculate what this time is worth and indicate it in the space provided on the blank.

Give a description of the plantation as called for on the form. The information conveyed by these reports will be a matter of record at the Department of Forestry. We desire complete and accurate reports.

SPECIES USUALLY AVAILABLE FOR FREE DISTRIBUTION.

All species listed under "Species to Plant" are not grown in State nurseries. The following species are usually available for free distribution.

White pine,	2 and 3 years old.
Scotch pine,	2 years old.
Pitch pine,	2 years old.
Norway spruce,	3 years old.
European larch,	2 years old.

The following species are occasionally available but in more limited numbers.

Red pine,	2 and 3 years old.
Japanese larch,	2 years old.
Bull pine,	2 years old.
Sugar maple,	1 and 2 years old.
White ash,	1 and 2 years old.
Red oak,	1 and 2 years old.
Honey locust,	1 and 2 years old.
Black cherry,	1 and 2 years old.

POINTS TO BEAR IN MIND.

1. Trees are furnished for forest planting only, not for shade or ornamental purposes.
2. They are for planting only in Pennsylvania.
3. Application should be made at least several months before the planting season, which begins about the first of April, and no application will be granted after the 31st of March.
4. Applications must be filled out in detail.
5. Notice as to whether or not the application can be granted will be given several weeks before trees are shipped.
6. Acknowledgment of receipt of nursery stock must be made promptly. For this, use Form 52, "Nursery Stock Receipt."
7. Remittance must accompany "Nursery Stock Receipt."
8. Seedlings must be planted without delay.
9. Make report to the Department of Forestry on the cost of the planting and the conditions under which the plantation was made. For this, use Form 34-B.
10. Be prepared to make report to the Department of Forestry on the condition of the plantation whenever requested to do so.
11. Fewer than 500 seedlings will not be furnished.

MAR 8 1920

Commonwealth of Pennsylvania

DEPARTMENT OF FORESTRY

BULLETIN NO. 16.

REPORT

OF THE

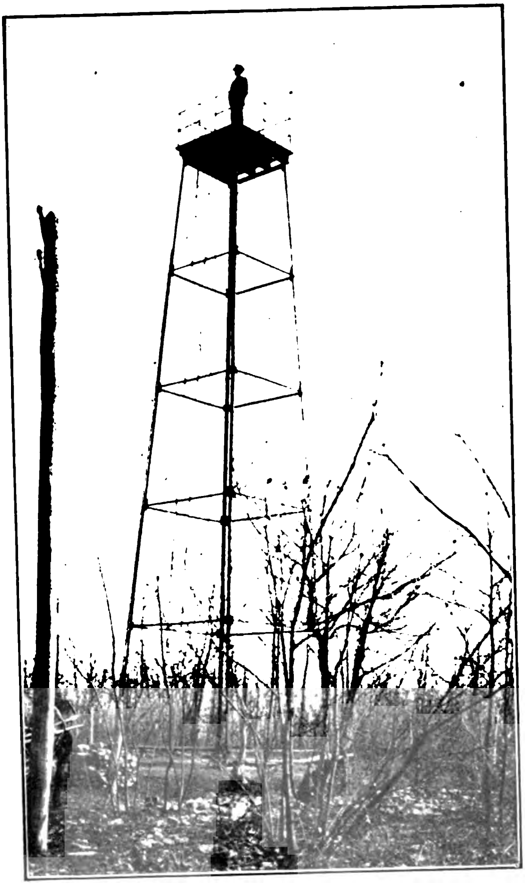
Chief Forest Fire Warden

FOR

THE YEAR 1916

Issued by Direction of the Commissioner of Forestry.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER.
1917.



Steel observation tower on Mont Alto State Forest.

Commonwealth of Pennsylvania

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PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN,
Commissioner of Forestry

IRVIN C. WILLIAMS,
Deputy Commissioner of Forestry

BUREAU OF FOREST PROTECTION

GEORGE H. WIRT,
Chief Forest Fire Warden

HOWARD W. SIGGINS,
Clerk

LETTER OF TRANSMITTAL

Ho[illegible]bert S. Conklin,
Commissioner of Forestry.

Dear Sir:

There is presented herewith the second annual report of the Chief Forest Fire Warden, setting forth the work of the Bureau of Forest Protection for the calendar year ending December 31, 1916. Your attention is called particularly to the following features: Payment of claims for fire extinction, and claims still pending; legal actions that have been started, and those still pending; and to the fine spirit of co-operation shown throughout on the part of the wardens and citizens. This opportunity is taken to express our appreciation to those individuals, or groups of individuals, who have helped us. Education and co-operation are sure to accomplish the results we are after.

Yours respectfully,

GEORGE H. WIRT,
Chief Forest Fire Warden.

Harrisburg, January 30, 1917.

ONLY 28 FIRES ARE REPORTED AS HAVING BURNED OVER MORE THAN 1,000 ACRES EACH, BUT THOSE 28 BURNED OVER MORE THAN HALF OF ALL THE LAND BURNED OVER

LARGE FIRES ARE THE RESULT OF SMALL FIRES UNEXTINGUISHED

ANNUAL REPORT

OF THE

CHIEF FOREST FIRE WARDEN

1916

The work of the Bureau has greatly increased during the year, and if any effective scheme of forest protection is to be realized, its work for the next several years must increase. When it is considered that forest protection is the most important part of forestry and without this phase of the work, practically all other forestry work is of short duration and probably of little value, it becomes self evident that the work of this Bureau should be developed as rapidly as possible. When Pennsylvania is rid of the curse of forest fire, forestry and its beneficent results will bring renewed prosperity and not until then. "The care of the forest brings all blessings."

The work of the year is discussed in detail under the following subjects: Reorganization of forest fire wardens; meetings of forest fire wardens; badges, wage rates, co-operation, publicity, legal affairs and financial statement. A budget covering expenditures for the next two years is presented, and a number of tables relating to forest fires.

REORGANIZATION OF FOREST FIRE WARDEN SYSTEM

At the beginning of the year, six counties had no wardens, and twenty-seven counties were almost completely reorganized. The end of the year finds all the counties reorganized, except Dauphin, Lancaster, Lebanon, and Montgomery. Carbon, Lackawanna, Lehigh, Luzerne, and Schuylkill have not been entirely completed on account of the probable organization of a protective association in the southern anthracite region. 1,343 certificates of appointment have been issued, leaving only 148 wardens from the old system to be investigated and reported upon. When the reorganization is complete, there will have been between 1,500 and 1,600 men appointed. Many of the former wardens were dropped and other men have been found.

The certificates used during 1915 and 1916 were small identification cards, on the back of which was printed a statement to the effect that the appointment expired January 1, 1917. The new certificate will be a sheet of paper 8½ by 11 inches, and will read as follows:

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF FORESTRY

This is to Certify That

....

having been chosen because he is specially qualified to perform the duties about to be required of him, and having subscribed to the oath of office, is appointed a

Forest Fire Warden

in the State of Pennsylvania.

He is hereby invested with the power and authority pertaining to said office, as prescribed by law, and shall continue as a Forest Fire Warden during good behavior, or so long as the service rendered is satisfactory to the Department of Forestry.

Given under our hands and the seal of the Department of Forestry of the Commonwealth of Pennsylvania this ....day of.................., 19....

....
Commissioner of Forestry.

Form 76.
(Seal)

....
Chief Forest Fire Warden.

It will be noted that this certificate provides for a permanent appointment. One of the things for which we must work in the forest fire warden system is permanency. Experience in the woods and in working with fire, as well as with the people of the community, is worth much to the Commonwealth. It will be our object, therefore, to choose good men for the service and then retain them as long as possible. It may not be amiss to state here that the wardens whom we now have in our organization are men who are interested in their work, honest, and capable. We do not expect to have to make many changes because of reasons other than those advanced by the wardens themselves.

The oath of office referred to in the new certificate of appointment has been approved by the Attorney General, and reads as follows:

PENNSYLVANIA DEPARTMENT OF FORESTRY

BUREAU OF FOREST PROTECTION

Form 75.

STATE OF PENNSYLVANIA } ss:
COUNTY OF.................... }

I, ..., do solemnly {affirm / swear} that I will support, obey and defend the Constitution of the United States and the Constitution of this Commonwealth; that I will discharge the duties of Forest Fire Warden for the Department of Forestry of this Commonwealth with fidelity, and that I will execute the orders and directions of the Commissioner of Forestry promptly and to the best of my ability; that I will not receive directly or indirectly any money or other valuable thing for the performance or non-performance of any act or duty pertaining to my office other than the compensation allowed by the Department of Forestry; that I will keep careful and accurate records of the work performed by me in the manner specified and required by the Department of Forestry; that I will render to the Department of Forestry a true and correct account of time and cash expenditures within 60 days of such expenditures; that time so expended and expense so charged shall have been necessarily incurred in the performance of my official duties; and that upon severing my connection with the Department of Forestry I will surrender the badge, the certificate of appointment, and all other property belonging to the Department of Forestry, then in my possession.

Sworn and subscribed before me

this............ day of ...., 191.......

....
Forest Fire Warden.

....

My Commission expires ....

In accordance with a ruling from the Attorney General, this oath of office together with a new form of certificate on each fire bill, will make it possible for us to do away with the affidavit which heretofore has been required on each bill. This arrangement will result in a saving to the Protection Fund of from $1500 to $2000 annually. It will also tend to greater promptness on the part of the wardens in forwarding their bills and reports.

FIRE DISTRICTS

Now that the local forest fire wardens have been located, it is necessary that arrangements be made as soon as possible for proper supervision. In accordance with paragraph (d), Sec. 102, of the Forest Protection Code (1915), forest fire districts have been determined upon in accordance with what we believe will be the future requirements for proper forest development and protection.

1. Erie, Crawford, Mercer, and Venango.
2. Lawrence, Butler, Beaver, Allegheny, Washington, and Greene.
3. Warren and Forest.
4. Clarion, Jefferson, Armstrong, and Indiana.
5. Westmoreland, Fayette, and Somerset.

6. McKean and Potter.
7. Elk and Cameron.
8. Clearfield and Centre.
9. Cambria, Blair, and Bedford.
10. Huntingdon, Mifflin, and Juniata.
11. Fulton, Franklin, and Adams.
12. Perry, Cumberland, and York.
13. Tioga, Bradford, and Sullivan.
14. Clinton and Lycoming.
15. Union, Snyder, Northumberland, Montour, and Columbia.
16. Susquehanna, Wyoming, and Lackawanna.
17. Monroe, Pike, and Wayne.
18. Luzerne, Carbon, and Schuylkill.
19. Berks, Lehigh, and Northampton.
20. Dauphin, Lebanon, and Lancaster.
21. Chester, Delaware, Montgomery, and Bucks.

In each of these districts there should be a district fire warden, who will have from 70 to 80 local forest fire wardens under his supervision, as well as from 5 to 10 patrolmen or tower observers, excepting districts 1 and 2. The supervision of so many men during the dangerous periods of the year, the proper investigation of fire hazards and causes of fires, the mapping of the forests of the district, the educational work to be done, and the general Department work to be looked after, will keep an active man more than busy. (See Budget, Page 80.)

MEETINGS OF FOREST FIRE WARDENS

The necessity of getting together the forest fire wardens within certain limits for their common acquaintance, co-operation, and instruction, had been recognized as a very important factor in developing efficiency. The Forest Protection Code, therefore, provided for such meetings and made it a part of the fire warden's duties to attend at least one meeting a year if so instructed.

On February 11th, the following schedule of meetings was arranged for the spring of 1916:

Schedule of Meetings for Spring of 1916.

Date.	County.	Town.	Place.	Time.
March 17	S. Centre.	Bellefonte.	Garman House,	10:00 A. M.
March 18	Monroe.	Pocono Summit.	Pocono Manor Inn.	10:00 A. M.
March 20	Tioga.	Wellsboro.	Coles House and Court House.	12:00 M.
March 23	Huntingdon.	Huntingdon.	Community House,	11:00 A. M.
March 24	Mifflin.	Lewistown.	Rod and Gun Club Rooms,	9:30 A. M.
March 25	Union.	Mifflinburg.	Buffalo Valley Inn.	10:30 A. M.
March 27	Clearfield.	Clearfield.	Leonard House and Court House,	12:30 M.
March 28	Bedford.	Bedford.	Grand Central Hotel and Court House,	12:00 M.
March 30	Clinton.	Lock Haven.	Commercial Hotel,	12:00 M.
March 30	N. Centre.	Bellefonte.	Court House,	10:00 A. M.
March 31	Elk and Cameron.	Driftwood.	Ladies Aid Hall,	10:30 A. M.
April 3	Berks.	Reading.	Berkshire Hotel and Court House,	10:00 A. M.

The reorganization of wardens was practically complete in these counties. In addition, an effort was made to arrange for two meetings in Potter county but nothing satisfactory could be determined upon. This schedule was sent to the various foresters within the above named counties for completing arrangements. As rapidly as definite information was received about the time and place of meetings, the following circular letter was mailed to each fire warden expected to be present at the place and time stated therein:

B. F. P. Circular Letter 8.

Dear Sir: The local forest fire warden "shall attend an annual meeting of fire wardens in his district when notified, or present a reasonable excuse." (Code, Art. IV, Sec. 404, e.)

A meeting for the wardens of your county has been arranged for at (time and place of meeting, town, and date).

We are very desirous of having all the wardens present and hope that you can attend. This Department will pay your necessary expenses. It is hoped that you can come and return on the same day.

Use the inclosed card to notify the forester making arrangements for your entertainment.

Make notes of anything relating to forest fire conditions or business in your township which you would like to have discussed at the meeting.

With each of these circular letters was sent a postal card addressed to the forester in charge of arrangements, for the warden to signify his intention to be present or give his excuse for absence, as follows:

shall
I shall not attend the meeting of forest fire wardens.

(If you cannot come, give your reason here.)

....
....
....
....
....
....

....
Local Forest Fire Warden.

(Be sure to sign your name.)

Below is a tabulated statement of attendance at the meetings and the expenses incurred in connection with them. It will be noted that 323 wardens (including foresters and rangers) were present, out of a possible 449 on the rolls. Rangers came at their own expense. In a number of cases, it was practically impossible for the wardens to get to the meetings on account of impassible roads. Considering all conditions, there was a splendid response to our call.

Including my own expenses to all of the meetings, the average cost for each warden present was only $1.64. It is doubtful if the same amount of good could have been done for the same amount of money in any other way, as subsequent results have shown.

Table of Results.

Date.	County.	Number of foresters on roll.	Number of foresters present.	Number of forest rangers on roll.	Number of forest rangers present.	Number of wardens on roll.	Number of wardens present.	Expenses.
1916.								
March 17	South Centre,	3	3	4	3	22	15	$30 83
18	Monroe,	1	1	....	....	33	19	7 56
20	Tioga,	3	4*	5	4	37	27	74 64
23	Huntingdon,	3	3	6	2	46	32	64 80
24	Mifflin,	1	2*	5	5	19	14	24 57
25	Union,	2	2	5	4	14	12	18 50
27	Clearfield,	2	2	4	2	41	35	61 56
28	Bedford,	1	1	1	....	40	23	38 83
30	Clinton,	6	6	8	3	36	27	50 04
30	North Centre,	1	2*	....	....	18	17	24 70
31	Elk and Cameron,	4	4	5	5	22	16	48 06
April 3	Berks,	1	1	....	....	49	27	28 93
	Expenses of Chief Forest Fire Warden.	....	....	....	....	....	....	56 70
		28	31	42	28	377	264	$529 74

*Attended by a forester from an adjoining county.

The following letter was sent to each forester in charge of each meeting:

Harrisburg, Pa., March 13, 1916.

Dear Sir: Inclosed is a program for the meeting of forest fire wardens of your county. As Chairman of the Committee on Arrangements, you will determine which fire warden shall be nominated for chairman of the meeting and which forester for secretary, and so arrange that the organization will take place without unnecessary loss of time. It is desired that the fire wardens be made to feel that they are taking an active part in the meeting.

You will also assign the subject "Local Attitude to Forest Fires" to the fire warden whom you consider competent to handle it well. The subject "Extinction of Forest Fires" should be given to one of the foresters. It is suggested that he follow the inclosed outline, but he may depart from it if he chooses to do so.

Suggested program:

Organization:

Chairman to be a fire warden if possible.
Secretary to be a forester.

Roll call.
Purpose of meeting (to be read).
Address by George H. Wirt, Chief Forest Fire Warden.
Local Attitude to Forest Fires (by a fire warden).
Discussion of local attitude and means to change it where necessary.
Extinction of forest fires (by a forester).
General remarks and questions.
Adjournment.

Purpose of the meeting, to be read either by the chairman or the secretary:

This meeting is called in accordance with provisions of the new Forest Protection Code passed by the last Legislature, and approved by Governor Brumbaugh.

The purposes in view are that the forest fire wardens of this county may know each other better, that they may be able to co-operate better with each other, that they may discuss questions relative to forest fire prevention and control, and that there may be a general improvement in the efficiency of the forest fire organization of our great Commonwealth.

Outline on "Extinction of Forest Fires:"

1. Detection of Fires

    Necessity for promptness.

    Means available.

        Towers.
        Patrol.
        Neighbors.

2. Notification of Fire Warden.

    By neighbor.
    By messenger.
    By telephone.

3. Local Organization for Extinction.

    Fire warden and helpers, each knowing just what his work is.

    Advantages of such an organization.

        Saving in time.
        Team work.
        Efficient men—few needed.

4. Speed in Getting to Fire.

    Everything thus far lost if speed is not made here.
    Catch a fire while small.
    Do not delay for anything.

5. Attack.

    Size up fire—use brains—know local conditions.
    Ten minutes thinking may save hours of work.
    Stop header first and then take side lines.

6. Equipment.

    Tools now used.
    Best tools and what is needed.
    Reasons for not supplying tools by State at present.
    Crew bring own.

7. Care of Crew.

    Little to be considered when promptness is the key note.
    Food and water to be provided when crew is out over 8 hours.
    Every means will be used to care for men.

8. Making Report and Bills.

    Have it understood that men must come to warden at time of fire and report name and time spent.
    Other details as issued by instructions.

In each case the remarks of the Chief Forest Fire Warden were intended to bring out the following facts:

1st. That under the reorganization each fire warden should realize that he has been chosen for an important work because of his qualifications to do that work.

2nd. That each man is a unit in a county group and each county group a company in an organization aggregating 1,500 to 2,000 men within the State.

3rd. That it is necessary for each one to be interested in the work and always ready at a minute's notice to do his part in order to cooperate with every other warden. Forest fire wardens may consider themselves as "Minute Men" in the suppression of a force which is robbing the Commonwealth of millions of acres of land.

4th. That the prevention and suppression of fires is an important work to the Commonwealth and a "man's job" into which any good citizen may throw himself and his resources because of his own interests and because of the service he may do his fellows and those who come after. From twenty to fifty million dollars is the annual loss on account of forest fires in Pennsylvania.

5th. That the prevention of forest fires is more important than mere extinction, and this must be made public sentiment.

6th. That the chief causes of fires are ignorance, carelessness, and indifference, and that the best means of prevention is education.

7th. That each fire warden, if interested, will be informed upon the subject of forest fires. He will talk about the necessity for their prevention to all his neighbors and warn every one with whom he comes in contact to be careful with fire in the woods.

8th. That each fire warden will let his neighbors know that he is a fire warden, and endeavor to get the best of co-operation from them and from every force possible.

Other points were touched upon in various meetings and many questions were answered.

FIRE WARDENS' MEETING FOR SOUTHERN CENTRE COUNTY

Held in Parlor of Garman House, Bellefonte, March 17th. *Chairman,* C. H Gramley; *Secretary,* W. E. Montgomery.

The meeting was called shortly after ten o'clock. After the reading of the purpose of the meeting, the roll was called and it was found that only eight wardens were absent. All but one had a reasonable excuse, and since then, he has been dismissed for inefficiency. One of our wardens, who is a sawmill owner, was present, notwithstanding the fact that the day before he had lost a finger in his mill.

After the address of the Chief Warden, questions were asked and answered.

One warden suggested the offering of prizes for reporting fires to a warden.

Hon. J. Linn Harris, then member of the State Forestry Reservation Commission, was present for a few minutes and welcomed the wardens to Bellefonte, expressed his interest in fire prevention, his gratification at the holding of such meetings, and the hope that the meetings may become annual affairs.

The fact was brought out that the Bellefonte Central Railroad had been the cause of many fires in "the barrens" and that they had now promised to burn protective strips along their right of way. From an area which had been burned over, and for which the railroad company did not want to pay damage, it was reported that on the average $300 was being paid in wages for the harvesting and marketing of the injured material standing on an acre.. In addition to this, the owner was making a fair profit. *This is a good example of the general ignorance* with respect to the value of young forest growth and to the damage that may be done by forest fires.

Forester Leonard G. Barnes read the following paper:

Extinction of Forest Fires

Mr. Chairman, Gentlemen: We are called together today to discuss the forest fire problem in Pennsylvania, with particular reference to the problem as found in Centre county. The paper I have to present to you deals with the extinction of forest fires and aims to point out methods of combating them successfully.

In forestry, there are three classes of fires recognized: the surface fire, the ground fire, and the crown fire. In Pennsylvania we are mainly concerned with the surface fire, and to that end the subject matter of this paper is directed.

In the extinction of a forest fire, there are five steps: First, the prompt detection and location of the fire; second, immediate notification of the fire to the proper official; third, the organization of a fire fighting crew; fourth, the attack upon the fire; and fifth, the making up of reports and bills.

In the detection of a fire, too much stress cannot be laid upon the necessity of promptness. Quick detection means a small fire with little or no damage resulting. Fire observation towers, patrol, and the people living in or near the forest, are the means depended upon for the discovery of fires. On State Forests, fire towers and patrol are used. Owing to the lack of appropriation, the detection of fires in wooded areas other than State Forests must depend largely upon the people.

Fire towers are structures erected upon places of high elevation, giving view to a large scope of country. They are located so that one tower may be seen from another. In this manner forest fires are discovered by a system of triangulation. Towers have men assigned to them during dangerous seasons. They will have telephone connections with foresters, forest rangers, and fire wardens. The observer, having a view of thousands of acres, will be enabled to spot a fire as soon as it occurs, definitely locate it, and notify the nearest fire official.

The patrol system is used mostly in level or flat county. This system serves a threefold purpose. It prevents fires, detects them immediately after they start, and extinguishes them while they are small. In sparsely settled regions, without the patrol system or lookout towers, a fire may burn for hours before it is discovered. The patrolman is generally assigned during exceedingly dry seasons to a certain area and charged with the duty of keeping fires out of his district. He is required to patrol this area regularly and may cover it one or more times a day. He should be familiar with the country, knowing all the roads, trails, streams, and other topographic features. His patrol is arranged that he will be in telephonic communication with the outside so as to be able to summon help, if needed. It is hoped that money will soon be available for the patrol of wooded areas other than State Forests because they are the ones that need it.

The detection of fires in areas not State Forests must for the present time, depend upon the people living in their vicinity. It is the duty of each fire warden, therefore, to create a sentiment among the people of his range to be constantly on the lookout for fires and to report them promptly. This can be accomplished by talking personally to the people, by circular letters, by telephone, and by the posting of fire notices in conspicuous places.

The notification of a fire warden must be immediate. Promptness is just as essential here as it is throughout the whole system. All the large fires result from letting time elapse between the start of the fire and the notification of the proper official. In a number of cases, as long as a fire is a mile or so from a person's property and he is not threatened, he will remain quietly at home and let the other fellow do the reporting and the putting out. It is such an attitude that we must overcome if forest fires are to be stopped. The fire warden should, as a duty to the State and the public, endeavor to break up this indifference wherever it exists. Let the people know you are a fire warden. Let them know what your duties are, and instill into them the necessity for immediate notification of a fire.

Notification may be made by means of the telephone or by messenger. The telephone is the better. It saves time. Where a telephone is not available, then messenger service should be used. It is not enough to know that a fire is burning on Nittany Mountain. Find out definitely from the informer the exact location of the fire, the best means of getting there, and the size of the fire. This will enable you to judge how many men you will need.

The third step in extinguishing forest fires is the organization of a fire fighting crew. Fire wardens should build up and maintain an efficient and effective cooperative fire crew. It should be a permanent crew, one that is dependable and always ready. Such an organization cannot be built up in a day or a week. It will take time. Now is the time to start it. The men should be made to feel that they are doing a patriotic service to the State. Holding a position in the crew should be regarded a mark of honor, trust, and faithfulness. Talk to the men in your community, using the information supplied by the Department of Forestry, and it should not be hard to organize a permanent fire fighting force. In selecting the men for the position, take only the efficient, the strong, and the active. Experienced men are preferable. It would be well in making up your crew to select those having telephones so that they can be assembled quickly. It is important that it be definitely understood that the fire warden is boss at all times. He issues the orders and expects them to be carried out. Members of the crew can give suggestions but not orders. Efficient work cannot be accomplished where every one is boss. The size of the crew need not necessarily be large. The day of the big fire is rapidly becoming a thing of the past. A small crew well organized is more effective than a large one loosely held together. Assign each man to a definite place on the crew and have him know just what his work is and what he is to do. Divide the crew into axemen, rakers, torchmen, and guards. If possible, have a central meeting place to which the men, upon notification of a fire, will go and from that place proceed in a body to the fire. The advantage of such an organization is self evident. Fewer men are needed, time is saved, efficient work is accomplished, and the fire is under control in a shorter time with less work and least cost. Until you build up your local fire organization, you will have to depend upon the old method of getting men wherever and however you can.

In getting to a fire, choose the quickest route. By this is not meant the hiring of transportation. Always walk to a fire if possible. Keep the fire bill as low as you can and yet give efficient service. If it becomes necessary to hire transportation, do so. Speed in getting to a fire counts 90 per cent. of the battle. The keynote of successful fire protection is prevention of forest fires and the prevention of large fires. A ten minutes' early start to a fire may mean hours of extra work saved and a small amount of damage done. The time to attack a fire is while it is small. As soon as a fire is reported, collect your crew and start. In the absence of a permanent fire fighting force, pick up men wherever you can. Insist upon the men going, but accept a reasonable excuse. The penalty for refusal of men to fight fire is a fine of $100, or one month's imprisonment, or both. Handle this matter carefully. A too officious manner may do more harm than good.

When the crew arrives at the fire, the warden will then give his orders as to how it is to be attacked. He must use his own judgment as to the best method of fighting it. To do this intelligently, he must know his district, the location of old roads, trails, and streams along which a line of defence might be made. He should know the general character of the country, direction and force of the wind, the probable size of the fire, and the location of the header. The head of the fire is that part which is advancing most rapidly. Knowing these things, a definite plan of attack can be worked out. Haphazard fire fighting is of no avail. Knowing what to do, how to do it, and why, saves time, labor, and money.

A forest fire starts as a small circle and gradually spreads out in all directions. If there is a wind, which is generally the case, it burns faster on the leeward side, assuming an oval shape and finally developing a distinct front or head. The size and shape of the head depends upon the topography of the country, the nature of the ground cover, and the force of the wind. In many cases, a fire may develop two or more heads and the windward side of the fire die out. In planning the attack, it is well to know that a fire travels rapidly up hill, due to the heated air currents forming a draft. After passing the crest of the hill, it travels slowly downward. The stronger the wind, the greater the speed of the fire. Fire also travels faster on a clear day than on a cloudy or damp day. The severity of the fire depends upon the condition of the floor cover. If it is just an accumulation of leaves, the fire will not be so hot nor travel so rapidly as it will in an old slashing.

On level ground or a slightly rolling country, the fire may be whipped out. This is accomplished by taking branches of pines and forming a broom. The whipping should be an underhand stroke towards the fire. Never raise the whip above the head and strike downward upon the fire. To do so will raise bunches of burning material on the next stroke and scatter them behind in unburned area, thus starting a new blaze.

A slow fire on level ground, or one that is burning downhill, may also be extinguished by cutting a fire line 2 to 3 feet wide a short distance in front of the fire and raking this line clear of leaves and debris down to the mineral soil. The material in the path should be raked away from the fire. Upon reaching this cleared line, the fire will go out from lack of fuel upon which to feed. It is necessary to keep men behind to watch that the fire, upon reaching this line, does not jump across. If it should cross, concentrate your men at this spot to stamp it out, otherwise the whole line will be lost and the work of no avail. Such a method of attack will call for the crew to be divided as follows: axemen to cut the line clear of young growth, rakers to rake the line clear of leaves down to mineral soil, guards to remain behind to prevent the fire from crossing. The warden should at all times know the progress of the work.

If the wind is high and the fire is burning rapidly up hill, it will be necessary to vary the form of attack and resort to back firing. Back firing is the setting of a fire in front of the main fire to burn towards it, against the wind, so that when the two fires meet, both must go out for lack of fuel. The use of the back fire should be understood and must not be allowed unless ordered by the warden. Back fires indiscriminately set result in needless damage and often endanger the lives of the men by their being caught between the back fire and the main fire. One of the most common mistakes in back firing is to overestimate or underestimate the rapidity of the main fire and not place the line in the proper place, thus burning over more ground than needed, or else losing the line entirely. Make your fire line far enough in advance of the main fire so that the heat of the two, when they come together, will not be so great as to drive away the guards. It should be placed so that when the two fires meet, there will be enough burnt ground between them that sparks and bunches of burning leaves will not blow across the line. It is important that the line be started far enough in advance of the main fire so that there will be plenty of time to start the back fire before it arrives. In many cases, men have been compelled to abandon hundreds of feet of line for this reason. Where it is necessary to fight a fire with back fire, first take your crew to the head of the fire. The success of the fight lies in controlling the header first. Divide your crew into two sections and send a gang downward on each side, working around the fire until they meet, or else until they run your line into burnt ground. The crew will be divided as follows: axemen, rakers, torchmen, and guards. The axemen go ahead and cut out a line 2 or 3 feet wide, clear of all young growth and brush. The line should be as straight as possible. Brush piles, logs, and dead snags should be avoided, keeping them outside of the line whenever you can. The material cut in making the line should be thrown away from the fire. Following the axeman come the rakers. Their duty is to rake the line clean of leaves down to mineral soil. The leaves should be raked towards the fire so as to give a good start to the back fire. The torchmen then follow and fire the line. The back fire should not be started until a considerable distance of line has been cut and raked. Behind the torchmen are the guards. They patrol the line to see that the back fire gets a good start and to prevent it from jumping across the cleaned line into unburned ground. There should be enough guards left behind to patrol several hundred feet of line. After the back fire has burned inward 15 or 20 feet, they should extinguish all fire along the edge of the line. If by any chance the fire should jump across the fire line into unburned ground, one guard should not attempt to put it out himself but should call for help. Concentrate the whole force, if necessary, in putting it out. If it gets beyond control, then the whole line is lost and the work must be started anew. After the head of the fire is under control, the wings must be taken care of immediately or else they may form a new head. Always back fire down hill and against the wind. The fire warden should know at all times the progress of the fight and the fire so as to be able to place more men at one point or reduce the number at another.

The fire is never out until the last spark is extinguished. A log or snag may smoulder and upon the freshening of the wind, break out and throw sparks, thus starting a new fire. When the fire has been surrounded and the work of the crew accomplished, the men may be discharged. Do not discharge your crew until you are sure all danger is over. Two or more men should then be left behind to extinguish all smouldering snags, brush piles, and stumps. Dead trees standing near the line should be cut down. The fire warden should also notify the owners of the land that they are expected to patrol the line, extinguishing all remaining sparks and preventing the fire from breaking out.

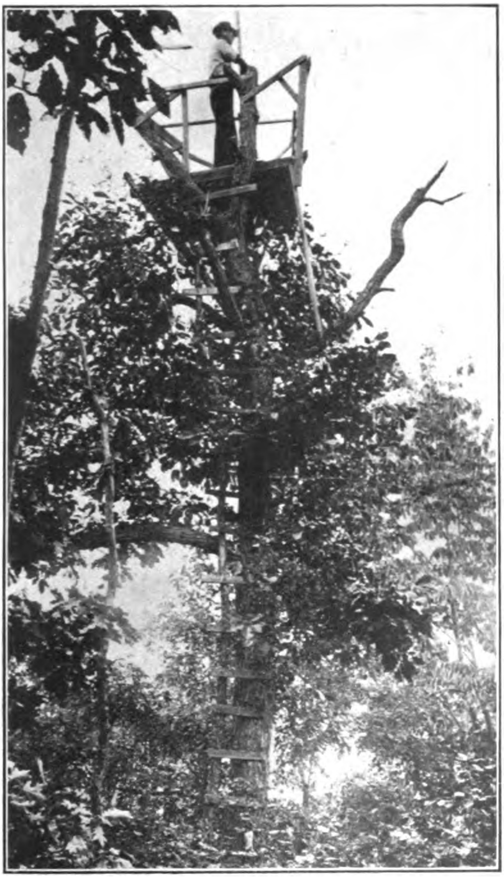
Effective work cannot be done without tools. No matter how large the crew, it is useless without tools. A few men with the proper tools are better than a large number poorly equipped. At the present time, each man brings his own tools. These generally consist of garden rakes, stable forks, mattocks, hoes, shovels, axes, and forked sticks. Sometimes it is necessay to borrow tools. In such a case, the warden should issue these borrowed tools to the men and make each man responsible for the return of the tool to the warden. If the man fails to return the tool, then the value of it should be deducted from his time. The appropriation of the Fire Bureau is so limited that it is not able to furnish the proper fire fighting tools to the wardens nor is it able to pay for any borrowed tool lost or stolen. It is hoped, however, that in the future, the appropriations will be of such a size that each warden can be furnished with fire fighting tools. The tools used for fighting fires on State Forests, and which are deemed the best, are rakes having 4 to 6 prongs and handles 3½ feet long, hand axes, double bitted axes, short brush scythes, and iron fire torches.

The care of the crew is an important factor in fighting fires, The treatment the men receive will influence to a large extent their willingness to come out to future fires. A warden who keeps his men out on the fire line without food or water will have a difficult time in maintaining his organization. Where the fire is of such size that the men will be out a number of hours past meal time, arrangements should be made to supply them with food. A hungry man will not put much energy into his work and will desert at the first opportunity. If it is necessary to supply the men with food, have lunches packed in town and distribute them to the men along the fire line. Lunches should consist of sandwiches, cakes, and hot coffee. It would be well to include in the lunches tobacco. Men will leave the fire to get tobacco and not come back. In ordering lunches, provide well for the men, but not extravagantly. The men should at all times be supplied with drinking water. A forest fire is an attraction for the boy. Use him to carry water to the men along the fire line.

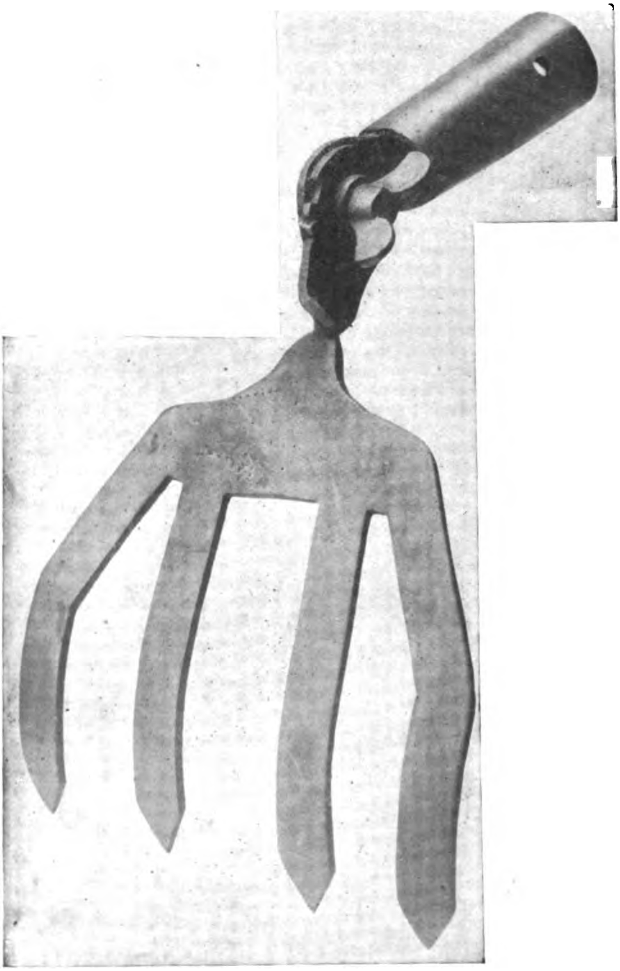
The last thing in connection with a forest fire is the making up of reports and bills. They should be made out on a typewriter or in ink, in a clear, legible, and orderly manner on the forms provided. In making out your forms, follow the printed instructions and if they are not clear, write for information. Many wardens have trouble when making out their bill for fire labor to know who was at the fire and the number of hours they worked. A permanent fire organization will eliminate this. For the present, have it understood that the men must report to you before going to work and must not leave the fire until discharged by you. An enforcement of this rule will enable you to keep a correct and accurate account of their time. The rate of pay must not exceed 15 cents per hour. Reasonable time may be allowed for going to and from a fire. All disputes about time should be settled at the fire. Pay the men promptly. Prompt pay means satisfaction and insures the turning out to future fires. The men must be paid by check. If it is not convenient for you to pay in that manner, indorse the check to the forester and he will make out the individual checks and give them to you for distribution. Have the men call for their checks. When this cannot be accomplished, mail the check to them. No owner, lessee, nor person employed by them, is entitled to pay for fighting fire on his land likewise no person responsible for the spread of a fire to forest land is entitled to pay for fighting fire. All bills must be forwarded to the Harrisburg office within 60 days after the fire occurred. Failure to get the bill in by that time will result in its not being honored. If the fire bill is small, it may be held for 30 days, and in this manner it is possible that more than one fire may be reported on Form 16. Incidental bills for team hire and provisions must be properly dated to agree with the date of the fire. They should be itemized, made out in your name, and receipted. Bills for transportation should show the distance traveled.

Make up Form 15 immediately after the fire while the information is still fresh. After a lapse of a week or ten days some facts will be forgotten.

Shortly after twelve o'clock the meeting adjourned for luncheon. Owing to the fact that many wardens had to take trains at 1:30 P. M., it was impossible to have an afternoon meeting. It was very apparent that two hours was not long enough to do more than touch upon a few of the points of interest to fire wardens. The coming together of those fire wardens for the first time, with few knowing each other, made it impossible for any kind of ready welcome upon the part of the foresters, and the men themselves were more or less backward in getting acquainted with each other. A badge of some kind would help a great deal in this matter and would be of considerable value in the field.



Old style tower from which forest fires were detected.



Forest fire rake designed by John L. Strobeck.

FIRE WARDENS' MEETING FOR MONROE COUNTY

Held at Pocono Manor Inn, March 18th.

For the third time, a director of the Pocono Protective Fire Association was host to the Monroe county forest fire wardens at an annual meeting. Mr. Edwin A. Hoopes kindly placed his beautiful inn with its conveniences, at our service, and provided dinner for all present.

The meeting opened at 10:15. There were present the five directors of the Association, the district forester of the county, a State game protector who was formerly a forest fire warden, the Chief Forest Fire Warden, and nineteen local wardens. Several men were detained at home on account of sickness, but most of the absent ones could not be present on account of heavily drifted roads. Mr. Hoopes, President of the Association, welcomed the men, after which the Chief Forest Fire Warden spoke upon the necessity of education concerning forest fires, co-operation for prevention and extinction, and promptness on the part of the wardens and their crews when a fire arises.

Mr. Hoopes spoke of the value of cautioning people who frequent the woods, and of the use of fire extinguishers. Mr. Strobeck explained the Protection Code with respect to fire hazards and nuisances, and requested the wardens to report such conditions to him promptly. On behalf of the Association he then presented to each warden present an adjustable iron rake, devised by himself, and explained its use. (See photograph).

Mr. DeHaven, a patrolman, who has rendered very efficient service, spoke of the co-operation he was getting from railroad men and that conditions were getting better each year. He has been given the privilege of riding upon certain trains in order to get promptly to a fire along the right of way.

There was then a general discussion of the duties of patrolmen, and results obtained by them; the getting of men out to fires; penalty for refusal to help extinguish a fire; rates of pay; dishonest claims for pay; huckleberry fires and incendiary fires. This being the third meeting of these wardens, they were more at home with each other and had a very full discussion of subjects of interest. The interesting fact was brought out that some owners of lands devoted to the growing of huckleberries were under the impression that they dare not burn off their own land for the improvement of the crop. Consequently, it is believed they set fire under cover and without regard to where it is stopped. If this impression can be changed, probably many large fires in the Poconos can be prevented.

The Secretary, Wm. R. Fisher, reported upon his visit to Boston and his attendance upon the meeting of the American Forestry Association. He reviewed particularly the advances in forestry activity and especially in forest fire protection.

Mr. J. A. Seguine appealed to the local pride of the wardens and spoke of the patriotism of their work. He urged co-operation among themselves and with every force available. Mr. Chas. N. Thompson spoke of the importance of forest protection to the Poconos. Because of their being a resort region, the green forests and running streams must be maintained.

FIRE WARDENS' MEETING FOR TIOGA COUNTY

Held in Court House, Wellsboro, March 20th. *Chairman*, William Kimball; *Secretary*, Thos. C. Harbeson.

Considering the condition of the roads, there was a very high percentage of our wardens in attendance. Only eleven men out of forty-five were absent. One man walked six miles over snow drifts to be driven sixteen miles in order to be present. Others walked or drove and some came on the train. Dinner was had at the Cole House and the meeting was called at about 1:30 P. M. in the Court House.

We were fortunate in having Hon. Robert K. Young present. He welcomed the wardens to Wellsboro, impressed upon them the importance of forest preservation and stated that the forestry work of the State is among the most important activities of the State, if not the most important. He approved such meetings because of the co-operation and efficiency they would foster. He further urged each one present to work for an aroused sentiment in favor of all forestry work.

The Chief Warden addressed the men and was followed by warden R. S. Brown of Morris, opening the discussion of "Local Attitude Towards Forest Fires." He suggested more publicity, and especially the printing of fire laws in newspapers. He spoke of rates of wages for fighting fire being small, the carelessness of hunters, fishermen, and smokers.

Hon. Horace B. Packer, told of the importance of forest preservation.

Forester John W. Keller then spoke on "Organization for the Extinction of Forest Fires," as follows:

In discussing this subject I want to take up the principal phases of the work from the moment the fire starts until the men have received their checks for services rendered. That old adage that the actual work at the fire is the only part of forest fire extinction is a thing of the past. The actual attack is so dependent upon other parts of the work and so many conditions must be considered that we must go deeper into the details if we hope to solve the problem.

The real keynote of every successful business enterprise in this day and age is organization. We find it in every plan from that of the day laborer to the President and it must be followed to bring results. Just so in forest fire extinction, if we are to be successful we must organize our work. It has not been so long ago, and I am sure we all remember the time, when wardens never thought of forest fires until they were notified. Then they picked up any men who could be had and did the best they could. We need but look at our Tioga county hills to be convinced of the folly of this method in keeping down forest fires. It has been tried and found wanting. Let us learn a lesson from the price we have paid and organize our work for the future.

Our Chief Fire Warden has been deemed the proper man to organize this work in the State. He has appointed what we believe to be a competent force of wardens in our county. The fact that he has called this meeting shows that he is doing his work but it remains for us to organize the work for individual fires. Conditions are so varied in the different localities that it is impossible to draw up a general plan. Nevertheless our organizations should all strive for the same end, namely, the suppression of fires as quickly as possible. The State work is being organized as a whole. Let us lend our aid by organizing for individual fires in our several districts

What are the duties of a fire warden as they appear in practice? A fire starts in your district. Your first duty is to know that a fire is burning. A warden has the work of his usual vocation to look after and cannot be expected to spend his time looking up fires which may never start. On the other hand the present appropriations for fire extinction are too small to permit the building of fire towers or the employing of patrolmen at all of the danger places. Hence the warden must get this information from other sources. Everyone in the community should know that you are a fire warden and should be made to feel it his duty to report to you any fire that may come to his notice. Persons who live near the danger places, or those having a commanding view of the wild lands should be especially induced to get this information for you. If there are telephones you can use, early reports as a rule will be forthcoming. However, where there are no telephones, arrangements should be made with some one to act as messenger so the information will reach you as soon as possible. Your own conditions will govern the methods you can employ but you should have it worked out to such a system that you can depend upon it for results. Figuratively speaking, you should be able to cock your feet up on the best chair in your house and smoke five cent cigars during the entire fire season, *knowing* that you will receive information of the first sign of smoke which arises from your district. Too many of our men in the past have trusted to luck for this information and by the time it would reach them the fire had grown to such a size that it could be stopped with difficulty.

You all know the value of getting to a fire immediately after it has started. You also know that all big fires have small beginnings, therefore, never make a practice of waiting until you see a lot of smoke before you think it necessary to go. Your assistance is most needed when the fire is small and you should take advantage of it and be on hand as soon as you can. If it is nothing but a smouldering camp fire, put it out.

Having received word that a fire is burning in your district, the next to be considered is the fighting crew. You should know before a fire starts, what men you can get in case of necessity and should arrange to have them go with you. These men should also know the work required of them, and should have the proper tools for that work ready at all times during the fire season. There should also be a general understanding that the men take a small lunch along. Don't forget to provide a means for getting word to your men when they are needed

The past appropriations for fire extinction have not been adequate to meet all the needs of the work. This is shown in the matter of tools. Each warden should have the necessary tools on hand but this will not be possible until the appropriations are increased. As to the kind of tools, that is strictly up to the warden. In some parts of the State garden hoes are used, in others, rakes, mattocks, forked sticks, plows, etc., so it remains for the warden to use his own judgment.

The men have collected with proper tools and are ready to leave. The next step is to get them to the fire as quickly as possible. It may be one mile or it may be fifteen miles away. Your previous arrangements should include a means of transportation which will get them to the scene of the fire in the easiest and shortest way. Automobile and team owners should be consulted beforehand so that they can be notified when you are summoning the fire fighters. This will give them time to get their conveyances ready by the time your crew is together and no time will be lost. If the fire is near at hand, don't bother with a conveyance as you will get there quicker by walking. No unnecessary expenses should be incurred.

As a rule, there are few instructions you want to give your men and you can do this on the way to the fire.

The next is the attack. While this is important, what has been said is enough to show that it is not the only part of the fight. Here we must be cool-headed and do some thinking before we begin our work. With the flames leaping, the brush cracking, and the wind blowing, we are apt to get somewhat excited and want to be doing something. That is just the time we should take a few minutes' time and size up the general situation. Notice the prevailing wind, the general topography, the header, and the rapidity with which it is traveling. Consider the number in your crew and where they can do the most effective work. When you are sure you have the general situation well in hand, set your men to work on the header and follow up with the side lines. Use good judgment and your small organized crew will work wonders.

Many of the old firefighters in this region will tell you that nothing can be done towards putting out a fire until night. This is a wrong impression. As soon as you have been notified that a fire is burning, go at once. If you arrive when the wind is high and everything looks bad, don't allow it to scare you. Collect yourself and then attack at the best point. You can do something to help extinguish a fire no matter when you arrive upon the scene.

Never allow yourself to be so absorbed by the fire that you forget your crew. Always remember that they are human and must have water to drink and food to eat. The State never asked you to starve your men. If it is necessary to keep them out longer than eight hours, provide food and be sure you have enough of it. There is nothing you can do that will make fire fighters lie down on you quicker than to fail to provide food and water when necessary. Take good care of your crew at all times.

As your crew is working along, don't forget to have a good reliable man follow you up. It is not possible to put out all the sparks when you go over the line the first time. The man or men forming your rear guard will assure safety over the lines you have worked. This is essential.

"A fire is never out until the last spark is dead." Do not take any chances. When you have surrounded the fire and have it under control, send a man around the entire line to make sure every spark is out. It may be necessary to put on a patrol for a day or possibly two, but this is better than allowing it to break out afresh.

I have tried to explain the important features which enter into the organization of forest fire extinction plans. Local conditions have much to do in solving the problems. Whatever you decide to do, make your plans before you are called out to a fire and you will soon be convinced that organization pays.

But you may ask if this will work out in practice. I say yes, and I can show you by results obtained in the southwestern part of our county. It will take a very few minutes for me to explain the protection policy as it appears and as it works out in practice on the State and on private lands coming under our supervision.

We cover approximately 90,000 acres of wild lands of whch the State owns 30,000. We have three telephone lines operating in the district which control about 48 miles of line. People who have phones have been co-operating with us and telephone immediately when fires originate near them. We have two towers on State land with telephone connections. A ranger with a test set is stationed on one of these towers every day during the fire season. In the event of hazy weather we have a man on each tower. The moment smoke arises from any part of State or private land within our limits, it is detected and telephoned to the office of the forester. The men on these towers are thoroughly familiar with the lay of the land and can tell within a very short distance, the exact location of any fire which may start.

We have signs along the railroad asking the trainmen to report forest fires to the nearest tower. The operators in these towers have instructions to telegraph the message immediately to Blackwell Station where it is transferred to the forester by messenger. In this way we keep in close touch with fires originating along the railroads.

Thus we have three distinct ways of detecting a fire the moment it starts. First, by the people and the use of the telephones; second, by the men in the towers; third, by the railroad employees. Last spring we had a fire seven miles from Blackwells and it was reported to the forester by each of these agencies within twenty-five minutes from the time it started.

Men are scarce everywhere over the district because it is so sparsely settled, hence we try to meet the situation by getting a crew together for work on the State lands during the fire season. This coming spring, we shall be planting trees and have our camp with twenty men on the top of the mountain. We shall string a mile and a half of telephone line from our camp to connect with the main line in the valley below. While the men are working, the cook will tend the telephone and will report all messages of fire to the forester in charge. Arrangements will be made with automobile owners and in case of fire they will be notified by telephone to have their machines at the most convenient place to meet the men. Tools for fighting fires will be in readiness at the camp and no time will be lost in getting started. We use canteens for carrying water for the men and have an order made out in advance for food, so that the nearest storekeeper can pack it in a convenient manner when needed. This saves time and avoids mistakes

By the organized system we have reduced the average acreage burned over by each fire from 904 acres in the year 1911, to 17 acres in 1915, while the number of fires has been reduced from 23 to 11 in the same period. Our system is much better now than in 1911, but it is far from perfect. Each year we hope to see improvements.

If an organized fire fighting force has done this much good for us in the southwestern part of the county, it will do it for you in your region. Organization is the keynote and the quicker all the wardens fall in line, the quicker we will have the fire hazard in Tioga county under control.

Meeting adjourned at 4:15 P. M.

FIRE WARDENS' MEETING FOR HUNTINGDON COUNTY

Held in Community House, Huntingdon, March 23rd. *Chairman*, H. H. Burdge; *Secretary*, T. Roy Morton.

Many of the wardens came to the Huntingdon County Community House in the morning and got acquainted with each other, but there were fourteen wardens out of forty-six who were not present. For a time, there was considerable dissatisfaction among some present both about their duties and about the rate of wages allowed employes. As the afternoon meeting progressed, this feeling seemed to change and a better understanding existed.

After having dinner at the Leister House, the wardens returned to the Community House and the meeting was called at 1:15. After the address by the Chief Warden, warden E. W. Stryker opened the discussion on "Local Attitude to Fires." He stated that in his locality, hunters were careful in the woods and brush burners were careful. He thought that the price of lumber and the leasing of camp sites on State land were inducements to be careful with fire. Mr. E. S. Heeter of Clay township stated that he had to contend with three causes of fires, viz.: The East Broad Top Railroad, cattlemen, and sawmills. He also has difficulty in getting men to help him.

Dr. E. H. Green contended that most fires in his district were caused by city hunters. There should be a penalty for smoking animals out of trees and logs. The press should be used to enlighten hunters.

There were discussions as to getting men, causes of fires, and methods of extinction. Forester A. W. Bodine took up in detail the outline submitted on fire extinction.

FIRE WARDENS' MEETING FOR MIFFLIN COUNTY

Held in Rod and Gun Club Room, Lewistown, March 24th. *Chairman*, E. L. Mertz; *Secretary*, D. K. Warfield.

Meeting was called to order at 9:30 A. M. All wardens but five were present. After the address by the Chief Warden, there was a general discussion as to local attitude of the people with respect to fires. The opinion was that the people generally were against the burning of the forests, but that ignorance is the cause of what indifference exists.

There was a general discussion as to how the wardens could work for forest protection and suggestions were made.

Mr. Warfield spoke of the value of young trees. Mr. Bodine requested the wardens to ask wood cutters to lop tops on their operations.

Ranger G. Edw. Ross exhibited a homemade iron rake which has proved very efficient in forest operation and in fighting fire. These rakes could be made for about 50 cents each.

Ranger William Wirth exhibited another homemade rake having a heavy wooden head with large spikes for teeth. This rake can be made for about 10 cents.

Mr. A. W. Bodine spoke on the "Extinction of Forest Fires," after which the meeting adjourned for dinner at the Crystal Restaurant.

FIRE WARDENS' MEETING FOR UNION COUNTY

Held in Parlor of Buffalo Valley Inn, Mifflinburg, March 25th. *Chairman*, Harry S. Frock; *Secretary*, A. C. Silvius.

The whole force of wardens in Union county was present except one forest ranger and one fire warden who was instructed not to come on account of distance and expense. One of the men on the roll and marked absent, it was afterwards learned had died. One warden walked twelve miles and back over well drifted roads and through slush to attend the meeting.

The meeting was called at 1:30 P. M. After the address of the Chief Warden, Mr. J. C. Ruhl opened the discussion of local Attitude to Fires. Some people were not opposed to fires burning. He asked for better means for detecting fires, and getting to fires, and for better equipment.

It was suggested that if the people of the county could be led to see the loss to fish and game, they would change their attitude.

There was considerable discussion as to equipment. Some favored knapsack sprayers, sprinkling cans, buckets, canteens, etc.

Mr. A. C. Silvius then discussed methods of fire extinction.

FIRE WARDENS' MEETING FOR CLEARFIELD COUNTY

Held in Arbitration Room of Court House, Clearfield, May 27th. *Chairman,* Andrew McQuown; *Secretary,* Wm. F. Dague.

Although the day of meeting was very disagreeable, all but six of the wardens were present and one had been instructed not to come on account of great distance. The meeting was opened at about 1:30 P. M., after dinner had been served at the Leonard House.

After the address by the Chief Warden, there was a general discussion on local attitude and instructions to wardens. Many questions were asked.

The difficulties resulting from the presence of the foreign population were discussed. They must be reached and educated in some way. Warden Sarowy was complimented as being the best man in the county to get along with the foreign element.

The wage question is a large factor all over Clearfield county. Mr. J. C. Hubler discussed the need of patrolmen, and co-operation with property owners.

Mr. Carl L. Kirk discussed the subject of Fire Extinction, and the meeting adjourned at about 4:30 P. M.

FIRE WARDENS' MEETING FOR BEDFORD COUNTY

Held in Court House, Bedford, March 28th. *Chairman,* W. A. Carpenter; *Secretary,* Wm. L. Byers.

Notwithstanding heavy rains and bad roads, there was a large percentage of the Bedford county wardens present at their first meeting. After dinner at the Grand Central Hotel, the meeting was called at 1:15 in the Court House.

Mr. J. L. Tenley, probably the oldest man in point of service among the wardens, opened the discussion as to local attitude with respect to forest fire. He related old methods when constables paid men for fighting fire and the county commissioners refused to pay the constables. He revived the past developments in forest fire work and He reviewed the past developments in forest fire work and remarked remarked that it has bees an educational period and that we are not yet out of nt.

There was then a general discussion as to the best method of fighting a fire. It was admitted generally that the fire burning most rapidly should be stopped first.

Prof. Lloyd Hinkle, County Superintendent of Public Schools, addressed the wardens and complimented them for being assembled for such an important work. He spoke of the great loss resulting from fires, the loss to lumbermen, the barren hillsides and consequent floods, and of the influence of beautiful surroundings upon the people in general and upon children in particular.

After the Chief Warden had spoken, there was a general discussion, and a number of questions were asked about the duties and powers of fire wardens.

FIRE WARDENS' MEETING FOR NORTHERN CENTRE COUNTY

Held in Court House, Bellefonte, March 30th. *Chairman,* Hon. J. Linn Harris; *Secretary,* George W. Sheeler.

Every fire warden but one was present, also one man who wanted to be a warden but who had not yet received appointment. The meeting was called promptly at 10:00 A. M. and Judge Quigley welcomed the men to Bellefonte. He spoke of the importance of the work and the value of such meetings. The chairman then emphasized the importance of our work, the value of organization and of getting the men together.

The Chief Warden addressed the wardens, and then each one present was called upon for some remarks.

This meeting was under the direction of the Central Pennsylvania Forest Fire Protective Association and practically all the officers were present and most of the Board of Directors. Mr. C. T. Fryberger, Vice-President, impressed upon the men four things, viz.: that they were picked men, that they should get after fires quickly, that their work as fire wardens is a contribution to the good of the community, and that when they see a smoke in the woods, each man shall make up his mind to be "boss of the smoke." The latter expression became a favorite in the meeting.

Forester John W. Keller was present and spoke on the necessity of complete organization, even before fires started.

Mr. W. C. Snyder, a director of the association and an official of the Lehigh Valley Coal Company, spoke of the value of local crews.

George W. Sheeler, Secretary and Forester of the Association, emphasized the need of prevention and mentioned the necessity of removal of hazards along railroads, about sawmills, etc., and the value of cautioning people who entered the forest, He requested wardens to be particular in reporting fires so as to give every possible detail.

Mr. James Uzzle spoke of organization, railroad fires, and care of crew. He stated that foreigners in his territory were not often the cause of fires, but that so much land is now posted against hunters and fishermen that he believed this condition of affairs to be responsible for many fires and the difficulty of getting men to fight fire upon such land. He also thought it might be a good thing to educate the Governor, the legislators, and other State officials as to the need of forest fire prevention and control.

Mr. Kelley emphasized the need of staying on the ground until the last spark is extinguished. His own experience shows the value of forest protection. Others suggested that the State must pay prevailing wages in order to get good men and that roads should be cleaned up and kept clean.

After a very satisfactory meeting, dinner was had at the Brockerhoff House.

FIRE WARDENS' MEETING FOR CLINTON COUNTY

Held in parlor of Commercial Hotel, Lock Haven, March 30th. *Chairman,* Wm. McKinney; *Secretary,* H. F. Critchley.

The meeting was called to order at about 1:30 P. M. Mr. H. W. Siggins addressed the wardens, setting forth the same ideas presented at other meetings by the Chief Warden. A general discussion followed upon local attitude to forest fires in various parts of the county and a number of wardens took part. Foresters F. H. Dutlinger and H. S. Metzger spoke on the extinction of fires. A very important point brought out for Clinton county was the need of more telephone lines.

The Chief Forest Fire Warden arrived before the meeting had adjourned, and was able to answer some of the questions held over for him. The need of an educational campaign in Clinton county is evident.

FIRE WARDENS' MEETING FOR CAMERON AND ELK COUNTIES

Held in Ladies Aid Hall, Driftwood, March 31st. *Chairman,* W. H. Weed; *Secretary,* W. H. Horning.

The meeting was called to order at 10:30 A. M.

After the roll call and the address by the Chief Warden, George B. McClintock read a very interesting paper showing a changed attitude upon the part of the public with respect to fires. The spirit of co-operation for fire extinction now prevails. Operators in dangerous country are closing down their mills and engines during dry weather. Others are taking precautions. Still education is necessary.

During the discussion, there was brought out the scarcity of labor and the necessity of co-operation on the part of the railroad companies. On account of steep hillsides, protective strips do not seem practical.

Forester W. B. Evans discussed the subject of fire extinction in a very practical way.

The same intense interest and spirit of self sacrifice was evident in the men at this meeting as had been evident in the other counties.

FIRE WARDENS' MEETING FOR BERKS COUNTY.

Held at Berkshire Hotel, Reading, at 10:00 A. M. and at Court House at 2 P. M. April 3rd. ***Chairman,*** **Solan L. Parkes;** ***Secretary,*** **James E. McNeal.**

The meeting was called in the reception room of the hotel, and after the address of the Chief Forest Fire Warden, many of the wardens spoke of conditions in their respective localities, and asked various questions. Tramps and railroads were blamed for most fires in Berks county.

Hon. I. C. Williams impressed upon the men the necessity of arousing their neighbors to understand the need of fire prevention and forest protection, the necessity of their being diplomatic, winning the co-operation of every one, including the newspapers.

The meeting then adjourned for luncheon in the Grill Room.

At the afternoon meeting, the Reading Boy Scouts were present. James E. McNeal, District Forester, read a paper on fire extinction, which was followed by discussion. Mr. Williams spoke on the Patriotism of Service as applied to forest protection. Mr. Wirt spoke to the Boy Scouts on "Be Prepared" and "Do a Good Turn Daily,, as relating to forest fire prevention, and tree planting. A member of the Boy Scout Council and President of Berks County Firemen's Association, and Mr. Tyson, Superintendent of Parks and Public Property , both spoke to the Scouts and wardens.

Hon. Henry D. Green then spoke on "Whether Forest Protection Pays." He impressed upon the boys the necessity of clean outdoor life in touch with nature. The use of the forests for recreation and as a source of beauty pays in dollars and cents.

After the Berks county meeting, the following letter (Circular letter 10) was sent to every warden who had been present at one of the meetings:

April 5, 1916.

Dear Sir: Meetings of the local forest fire wardens have now been held in most of the counties in which the reorganization under the new law has been completed. The results of these meetings have been very satisfactory. Evidences of enthusiasm have been apparent everywhere. We have been highly gratified by the display of interest on the part of the wardens, many of whom put themselves to considerable personal inconvenience to attend the meetings.

We wish to take this opportunity to thank you for the interest you have shown, and to express the hope that you will not allow it to lag. Owing to the small appropriation allowed us, much of the results that are accomplished this year must be due to personal efforts on the part of the wardens themselves. By arousing local interest in forest protection it is hoped that each member of the legislature can be induced to support an appropriation of $75,000 a year for protection of our woodlands. This amounts to a cent an acre for the area protected, and will enable us to complete a permanent and effective protection system.

We sincerely hope that you will feel no hesitation in writing to the Department whenever you desire to offer any suggestions for the improvement of local or general conditions, or ideas for interesting the people of your county or the whole State in your work. Before the next legislature convenes we must have the whole State ablaze with enthusiasm for the protection of the forests.

FIRE WARDENS' MEETING FOR McKEAN COUNTY

Held in Tide-Water Building, Bradford, at 1.30 P. M., September 8th.

District Forester R. Lynn Emerick acted as chairman of the meeting, and introduced the Chief Forest Fire Warden. After his remarks, there was a general discussion concerning forest fire conditions within the county, the attitude of the people, causes of fires, wages, bills, and reports. The subject of fire extinction was also discussed. Ten of the eighteen wardens on the roll were present. Several other persons interested in fire prevention and extinction were also present. The expenses of the meeting were $24.44.

FIRE WARDENS' MEETING FOR FULTON COUNTY AND PART OF FRANKLIN COUNTY

Held in Court House, McConnellsburg, 10.30 A. M., and 1.30 P. M., October 11th.

Forester A. E. Rupp acted as chairman of the meeting. After the roll call and the address by the Chief Forest Fire Warden, there was a general discussion of the forest fire situation. At the afternoon meeting, many questions were asked concerning the duties of wardens and Mr. Rupp discussed the subject of fire extinction. He also touched upon methods by which the cause of fires might be determined.

This meeting was intended to include all the wardens of Fulton county, and out of 36 on the roll, 31 were present. All wardens of northern and western Franklin county were expected to be present also. Sixteen out of 19 were present. There were two State Forest rangers present, making a total of 50. The expenses of the meeting were $110.39.

BADGES

Ever since the passage of the Act of 1909, there have been many requests from wardens for some sort of badge. During the latter part of this year designs were submitted by a number of the State foresters, and one finally adopted. The badges, which will be ready for distribution early in 1917, are circular, 1¼ inches in diameter. Around the outer edge are the words "Pennsylvania Forest Fire Warden" in raised letters. In the center is a keystone with a raised oak leaf. The badge will have a polished nickel finish.

RATE OF WAGES

The one question that was uppermost in the minds of the wardens in every county was that of wages for men. Fifteen cents per hour is lower than the average rate of wage in practically every part of the State, A warden may realize the necessity of fire extinction. He may be well aware of his authority to summon men under penalty for refusal, yet he hesitates to ask one of his friends or neighbors, who may not be interested very much in forest protection, to quit a job paying 25 or 30 cents per hour for one paying 15 cents per hour, and a very unsatisfactory job at that. This proposition has made it difficult for us to find good men quickly for the position of local forest fire warden. It must be admitted that fighting fire is a very hot, dirty, tiresome, and sometimes dangerous work. Not infrequently damage is done to shoes and clothing, requiring more outlay for repairs than the amount of wages received for fighting fire. Any one who fights fire and works honestly earns 25 cents per hour and more.

Still there are those who say that even at 15 cents per hour, there are people who will set fire in order to get work. This has been a common statement ever since the State has endeavored to prevent or control fires. It may be granted that some few fires will be started for this reason. It would not be the first time, or the only method of starting something in order to get money unjustly from the State. But the instances evidently are so few that there need be no alarm about very much money being wasted in this way. For the man who wants money can find many ways of getting it easier.

A possible solution to the trouble may be to pay regular wages earned by the men who can be organized into a local fire crew by the forest fire warden. This will make possible the choosing of good men in a community to be trained for a community service and at little or no loss to themselves. They will see to it that fires are promptly suppressed, and other assistants will not be needed. Ten good men on a fire line will do more than fifty untrained and careless people. Should other persons be needed at any time, the fire warden may call upon other people and pay them fifteen cents per hour, or any other rate determined upon by the Commissioner of Forestry for the State or any particular district. This proposition, if carefully worked up, will solve a number of problems which have to be faced under the present unsatisfactory conditions.

CO-OPERATION

During the year we have endeavored to maintain co-operation with various State Departments and their employees, and at the same time to interest new forces.

GAME COMMISSION.—In his report as Secretary of the Game Commission for 1915, Dr. Joseph Kalbfus writes as follows:

"From observation extending through many years, I am satisfied more harm is done to the cause of game and wild bird increase by forest fires, then is done in any other way, and especially by early spring fires, when our birds are nesting, or at a later period, when the young of both animals and birds are helpless. Aside from this, the destruction by fires of the growing trees and shrubs and vines, through which a food supply for wild creatures is produced, is a most serious proposition and some radical step should be taken to have our people, not only sportsmen, but all our citizens, understand that each individual will be held responsible for the damage done by forest fires in his district. Sportsmen should see to it that every possible aid be given our Department of Forestry in the care of lands under its control. The man who either wilfully or negligently starts a forest fire should be made to understand that he is not specially injuring the Department of Forestry, but instead is destroying something that belongs to all the people, that when gone can perhaps never be replaced. Such people are undoubtedly criminals and public enemies, and every sportsman in this State should constitute himself a committee of one to see to it that such criminals are placed behind the bars, where they belong. When we consider the loss sustained and the vast injury done by forest fires, it seems to me the expense of keeping in prison the men who start these fires is but a small item as compared with the possible loss that may come through their being at large."

In April the following correspondence took place:

Harrisburg, Pa., April 20, 1916.

Dr. Jos. Kalbfus, Harrisburg, Pa.:

Dear Sir: Will it not be possible to have placed upon the licenses which will be issued to hunters this fall some brief statement with reference to the necessity of carefulness with fire in the woods? Such a statement need not be lengthy. In fact, the shorter it is, the better. The following might be used: "Please be careful with your fire in the woods" or "Forest fires destroy game."

As you know, we are now reorganizing our forest fire wardens all over the State and this organization will soon be in such a condition that the fire wardens will be able to cope very satisfactorily with the forest fires that occur. The principal difficulty, however, in the majority of cases, is in the fact that fire wardens do not receive notice of forest fires as soon as they have started. In this particular phase of our work, your game wardens can be of great service to us. We are just publishing a list of the forest fire wardens in the State, and with this list in the hands of your men, would it be agreeable to you to issue instructions from your office to all game wardens to co-operate closely with the forest fire wardens by keeping a close lookout for fires, and upon discovering them to report promptly to the nearest fire warden? If such a letter can be issued from your office, we shall be very glad to see that it is inclosed with a list of our fire wardens to each of your men, providing, of course, we can obtain an up to date list from you to be placed in the hands of the Division of Distribution of Documents.

Yours truly,

(Signed) ROBERT S. CONKLIN,
Commissioner of Forestry.

Harrisburg, Pa., April 21, 1916.

Hon. Robert S. Conklin, Commissioner of Forestry, Harrisburg, Pa.

My Dear Sir: We are just in receipt of your letter of the 20th inst., and beg to advise that we intend placing on one side of the Summary on the back of the 1916 Licenses the following:

"Forest fires destroy game. It is to your interest to guard against them."

On the other side of the Summary we intend placing the following:

"Please be careful with your fire in the woods. It means more game to you."

We are also preparing a letter, as per your suggestion, to send out with the lists of your fire wardens and will forward same to you on Monday or Tuesday, together with complete list, in triplicate, of our Special Deputy as well as our Regular, Salaried Game Protectors.

Respectfully yours,

JOSEPH KALBFUS,
Secretary, Game Commission.

Harrisburg, Pa., April 21st, 1916.

TO ALL OFFICERS OF THE GAME COMMISSION:

My Dear Sir: Enclosed please find a list of fire wardens as appointed by the Department of Forestry in the various sections of the State, and we ask that you keep on the lookout for forest fires and notify the Fire Warden nearest to you immediately when you see or hear of a forest fire, *and yourself, help in extinguishing such fires* in every way possible, as forest fires destroy more game than legitimate sportsmen kill in years.

Do all you can to create sentiment in favor of preventing forest fires at all times.

Do what you can to create sentiment that will influence members of the coming Legislature to give to the Department of Forestry an appropriation sufficient to insure the work expected of them, to buy additional wild lands and to care for that land as it should be cared for. It is as much your duty to look after these matters as it is to prosecute violators of the Game Laws or to do anything else in the line of your work.

Respectfully yours,

JOSEPH KALBFUS,
Secretary, Game Commission.

As a result of the foregoing, every hunter who purchased a 1916 license, had his attenton called to the necessity of care with fire in the woods. We hope that the idea of having a line or two concerning forest fires upon the hunting licenses may become a permanent feature.

The game protectors and deputy game protectors have been cooperating wth us in many ways. They have notified our fire wardens when fires have come to their notice; they have assisted in the extinction of fires; they have given their time and the use of their own automobiles in the reorganization of the fire wardens; and in other ways assisted in the work of fire prevention and extinction. In Indiana county, largely through the efforts of the game protector, two outlaws accustomed to set fire to buildings and forests in order to see the fire burn, were apprehended.

Unfortunately we were not able to supply the special deputy game protectors with rosters of forest fire wardens. The letter of instructions was sent to them later, and again to the game protectors, with the following circular letter from our office:

October 20, 1916.

TO ALL OFFICERS OF THE GAME COMMISSION:

Dear Sir: Owing to a mistake on the part of the printer we are short two thousand copies of our list of fire wardens and consequenty are unable to supply you with such a list this season. However, we hope you will do all in your power to protect the forest from fire and will co-operate with our local wardens as they become known to you.

Inclosed are copies of literature and stickers which we shall gladly supply to any one who will use them to good advantage. Let us know if you wish to have some sent you, specifying the number of each that you can use.

B. F. P. Circular letter 16.

As a result of this circular, a fair percentage of game officers requested literature and distributed it.

DEPARTMENT OF FISHERIES.—The following correspondence shows that we have had the same cordial support from the officials of the Department of Fisheries:

April 20, 1916.

Hon. N. R. Buller, Harrisburg, Pa.

Dear Sir: In behalf of the closer co-operation of your fish wardens and our forest fire wardens, I shall be glad to have your opinion upon the following proposition.

We are just having published a list of our forest fire wardens as they are now located all over the State. By reason of the reorganization of our forest fire warden system, these men are, or soon will be, in a fair position to cope with the forest fire problem. However, in the majority of cases, a great handicap is present because of the fact that fires do not always come to the attention of the fire warden as promptly as they might. Therefore, any assistance which we can get from any officials, organizations, or private individuals which will help us in having notice of fires given promptly to the fire wardens will be of great service. Would you be willing to issue a letter from your office to each of your wardens, instructing them along this line, namely, that just as soon as they discover a forest fire in any portion of their territory, they shall consult the roster of wardens for that particular region and notify the nearest forest fire warden? If such a letter is prepared, it is altogether possible that we can have it sent right with our list of wardens, providing we have an up to date list from you so that we may place it in the hands of the Division of Distribution of Documents.

Yours truly,

ROBERT S. CONKLIN,
Commissioner of Forestry.

Harrisburg, Pa., April 26, 1916.

Hon. Robert S. Conklin, Commissioner of Forestry, Harrisburg, Pa.

Dear Sir: Upon my return to the office after an absence of ten days I find your letter of April 20th requesting the co operation of the wardens of this Department with your Forest Fire Wardens. This Department will willingly co-operate with you in this work and I have this day sent to each warden of this Department a letter instructing them that they should at all times co-operate with your Forest Fire Wardens, and should they discover a forest fire, they should immediately take it up with the warden in the particular region in which the fire is.

While the law allows the employment of thirty fish wardens, the appropriations will permit the employment of only ten.

Attached hereto is a copy of the letter written to the wardens, also a list of the wardens together with their home addresses. If you will have sent to each of the wardens shown on this list, a list of your wardens, it will be carried by the men of this Department at all times, and you can rest assured that this Department will co-operate with you in every possible way.

Very truly yours,

N. R. BULLER,
Commissioner.

April 26, 1916.

Dear Sir: You will receive from the Department of Forestry a list of the Forest Fire Wardens of that Department and you are hereby directed that should you run across any forest fire at any time, or have knowledge of any such fire, you will at once consult the roster of wardens and notify the nearest forest fire warden. This is a very serious problem and you will co-operate with the Forestry Department in every way possible.

Very truly yours,

N. R. BULLER,
Commissioner.

The fish wardens have reported fires to our fire wardens, have helped to extinguish them, and in a number of instances put out small fires before they reached a size large enough to do damage. This force ought by all means to be increased on account of its own work and on account of the many small fires which an increased number of such men patrolling streams would extinguish. Many of our spring fires originate from small fires built by fishermen who leave them without seeing that they are extinguished.

STATE POLICE.—This Department has always been granted assistance by the State Police force if it has been at all possible to comply with requests. This year, as formerly, the policemen have assisted in fire extinction and in the detection of those responsible for forest fires. By special request, three patrolmen stationed at Cresson were instructed to pay particular attention to forest fires. Along the State Highway across Laurel Ridge in Westmoreland county, travelers have been accustomed to build fires for warming lunches. Frequently such fires have spread and done considerable damage. The matter was referred to the State Police and during the dry period of November and December, special patrols have been on duty.

As a result of investigation by State Policemen, suit was instituted in Monroe county against four men for firing the woods. These men plead guilty and were fined. Also, a suit was brought against the Lehigh Valley Railroad Company in Luzerne county.

There is no question as to the fact that if the State Police force were doubled, game, fish, and forest law violations would be reduced greatly, violators would be brought promptly to account, and it would be necessary to employ only a few special patrolmen during forest fire seasons.

STATE HIGHWAY DEPARTMENT.—The following circular letter was sent to the fifty Superintendents of State Highways.

July 19, 1916.

Dear Sir: In accordance with an agreement with W. D. Uhler, Chief Engineer of the Department of Highways, it is our desire to place in your hands, and the hands of each foreman and patrolman, a list of the forest fire wardens of the State so that when any of your men discover forest fires, they may be reported promptly to the proper warden who will take immediate steps for their extinction. Will you be kind enough, therefore, to either send me the names and addresses of the foremen and patrolmen under your direction, or give me the number of copies which you will require for distribution?

A prompt reply was received from each superintendent, either giving the names and addresses of their foremen, or stating the number of lists of fire wardens required. Many of them expressed a willingness to do all in their power to assist us. Before all the replies were received, however, it was found that our supply of fire warden lists would not be sufficient for our needs and the following letter had to be sent to the superintendents.

Harrisburg, Pa., September 13, 1916.

Dear Sir: Under separate cover you will receive a copy of the report of the Chief Forest Fire Warden for the year 1915. I call your attention to the correspondence set forth on pages 37, 38, and 39 of this report.

During the summer I have had correspondence with most of the Highway Superintendents, who have given me lists of foremen under their direction to whom copies of this report could also be sent. Unfortunately, our supply was exhausted before it was possible to supply each of the foremen with a copy. Such being the case, I am asking you to do whatever you can towards acquainting your foremen with the names and addresses of the forest fire wardens nearest to them. The list of fire wardens will be found in the report sent to you beginning at page 112.

Some of the men went to considerable trouble to acquaint their foremen with the names of the fire wardens and how they could be reached.

Unfortunately during the year a number of complaints have been received about various highway operations. A steam roller was the cause of a fire; careless employees are supposed to have caused a fire; complaints of brush cutting without proper removal of the same were received from Lycoming, Fulton, and Centre counties; township supervisors did the same thing in Clearfield and Mifflin counties; and in Clinton county one fire is reported as having been the result of careless burning of leaves along a State Highway by one of the foremen. In every case these complaints were referred to the State Highway Department, and assurances were made that proper steps would be taken to correct the trouble and that instructions would be issued so as to prevent the possibility of similar complaints in the future. In a number of cases, it is becoming a fixed rule that any material mowed or cut along a State Highway is burned at once. This is as it ought to be. Highways are something more than routes of travel. Anything that mars the beauty of a route is a detriment and must be eliminated. Railroads spend millions of dollars to beautify their rights of way and the State must pay some attention to the same idea. Weeds and brush should be removed for this reason alone, but when they become a menace to forest property, then there are additional reasons for their prompt removal.

We have also been supplied wth county highway maps which have been of great assistance to us.

OTHER STATE DEPARTMENTS.—In a number of instances we have received assistance in notification of fires from deputy fire marshals. We should have some definite plan of co-operation with the State Fire Marshal and his deputies. The Geological Survey Commission and the Water Supply Commisson should be able to give us valuable help in the much needed forest map of the State, the beginning of which we were unable to accomplish this year. The Department of Education and the Department of Agriculture can aid us in making it possible to carry on educational activities in the schools and among farmers. Through the officials of State College, we have been promised the assistance of farm experts, especially in counties where there are only farm woodlots, and where we have few fire wardens. In fact, since forest fires affect all classes of people and all factors in which our government is interested, it should be a rule among all State employes to notify fire wardens promptly of any forest fires which come to their attention.

FIREMEN'S ASSOCIATION OF PENNSYLVANIA.—Early in 1916, as a result of our correspondence with them, the officials of this association promised their cooperation in the protection of forests from fire, if we could present a plan which could be agreed upon. Unfortunately, because of impossibility of completing the reorganization of forest fire wardens, and of putting into effect certain publicity measures, no plan satisfactory to us could be drafted. We trust, however, that something along this line may be accomplished soon, especially as there is a close association between the State Fire Marshal's Department and the firemen of the State.

U. S. DEPARTMENT OF AGRICULTURE.—This bureau has been very glad to supply the U. S. Bureau of Forestry with copies of all forest fire statistics and to supply any other information at hand when requested. The U. S. Bureau of Plant Industry furnished us with a card list of known white pine plantings within the State so that we could be of help in checking up the white pine blister rust. This list, in turn, was furnished by us to our own Economic Zoologist for the use of the blister rust inspectors working under his direction.

BELL TELEPHONE COMPANY OF PENNSYLVANIA.—The legal department of this company very gladly promised cooperation with us in the matter of eliminating fire hazards along their rights of way by seeing to it that their men burn carefully all brush and weeds mowed thereon, especially in forest regions. Other requests have been made upon the company which we hope to see materialize in the next year.

BOY SCOUTS OF AMERICA.—Because of the instructions which are being given to Boy Scouts constantly, they are a valuable aid to the Commonwealth in forest protection work. In a number of places, Pennsylvania foresters are scout masters, and a number of scout masters have been made forest fire wardens. The organization is assisting in practical ways and the results of the present training must surely mean greater regard for the forest when the scouts become men.

In Berks county, scouts have served as fire observers on high points, and as patrolmen. From Cambria county, an instance is reported as follows: The scout master is a fire warden and had a crew of men at a fire. He needed six more men. A scout was sent to a high point to send out the necessary message by International Morse Wig-Wag System with the hope that some scout near the city would catch the signal and get the men. The message was caught and in a very short time reinforcements were on their way to the fire.

In Johnstown, our District Forester was able to have a very important resolution passed upon by the City School Board. It is as follows:

Whereas, The Boy Scouts of America are actively engaged in rendering efficient help in preventing and suppressing forest fires and particularly in the vicinity of Johnstown, where official notice has been taken of the good work of the Johnstown Scouts in these words of the Chief Forest Fire Warden, George H. Wirt, Harrisburg, Pa. "I wish you would extend to the Boy Scouts of Johnstown my appreciation of their co-operation in the matter of notifying our wardens of the presence of forest fires and of any other assistance which they have rendered in extinction, etc."

Therefore, To aid in the suppression and extinction of forest fires, which annually destroy thousands of acres of timberland in Pennsylvania, causing an economic loss to labor each year of at least $20,000,000 and making the water supply impure and uncertain, the School Board of the City of Johnstown, through the Superintendent of the City Schools, will co-operate with the Pennsylvania Department of Forestry in this way:

When a duly authorized forest fire warden of the Department of Forestry makes a request to the principal or teacher of the school which the scout or scouts asked for attend for the excuse of such scout or scouts for the purpose of preventing or extinguishing forest fires, such scout or scouts shall be excused from classes and other school exercises for a reasonable period, and shall receive credit for such absence it being understood that the Forest Fire Warden shall first summon the available men in the vicinity of the fire.

Approved September 18th, 1916.

School Board of the City of Johnstown,
J. N. Auee, Supt. City Schools.

Pennsylvania Department of Forestry,
Walter D. Ludwig, District Forester.

SPORTSMEN'S ORGANIZATIONS.—County and State Camps of sportsmen have endorsed our efforts to protect the forests and undoubtedly considerable good work has resulted from their activities. Reports from several counties in particular refer to the change in attitude of the people concerning forest fires as being due largely to the efforts of the sportsmen. Unfortunately notwithstanding the attitude of the better class of sportsmen, a large percentage of fall fires this year have been attributed to hunters.

The Meadville and Franklin Camps of the Wild Life League passed the following resolutions:

Whereas, five million acres of land within the Commonwealth of Pennsylvania is lying unproductive as a result of forest fires, and

Whereas, this repeated devastation of our woodlands by fire tends to render meaningless our efforts for the protection and propagation of game, fish, song and insectivorous birds in these regions, and

Whereas, an additional nine million acres in this Commonwealth is, by reason of lack of knowledge on the part of the owners, producing only a fraction of the value which it ought to produce, and

Whereas, this state of non-productivity or partial production results in a very material loss to every citizen of this Commonwealth; therefore be it

Resolved, that we, the members of Meadville Camp of the Wild Life League of Pennsylvania, do hereby pledge our hearty support to the work of the Pennsylvania Department of Forestry in its efforts to stop this devastation by fire and to render more productive all the forest lands within the Commonwealth, and further be it

Resolved, that we will require of each candidate for the legislature from this district a statement as to his position on the subject of forestry in Pennsylvania, and further be it

Resolved, that a copy of these resolutions be spread upon the minutes, and that they be referred to our magazine as official business for the consideration and action of each and every camp of the Wild Life League in Pennsylvania.

At the annual meeting of the Wild Life League, the following resolutions were presented and acted upon favorably:

No. 1. Resolved, That the work of the Pennsylvania Department of Forestry is fundamental and original; that it is the basis of the game and fish life of the Commonwealth; that all real recreation in the forest depends upon the preservation and restoration of a proper wood cover; that the forest is the preserver of the mountain streams and the nursery of the bird life of the State; and that it contains in itself the essentials for the conduct of the major activities of this League.—Approved.

No. 2. Resolved, Therefore, that the Department of Forestry should be consistently, regularly, and adequately supported by such appropriations of public money for use in the furtherance of its work as will enable it to accomplish the results it is capable of obtaining; that the appropriation for the protection of the forest lands of the State from fire and depredation should not be less than one cent per acre for the 7,500,000 acres of forest land to be protected, or a minimum amount of $75,000 per year for this purpose; that the fund with which to purchase additional forest lands should be enormously augmented beyond what is now allowed for the purpose; that the pitiful and paltry appropriation of $20,000 a year for the purchase of State Forest land is beneath the dignity of the Commonwealth of Pennsylvania, and that an amount not less than $250,000 per year should be appropriated for this specific purpose; that the appropriation for the development and maintenance of State forests, to include the salaries and expenses of the trained men now in the employ of the Department earnestly engaged in this work, should be of such adequate size that the Department will not be compelled to discharge men, but that it may retain and equip its employes in a manner befitting the work in which they are engaged, pay the suitable remuneration, and accomplish the work of maintenance and development in orderly sequence that in the shortest possible time it may restore the barren lands of Pennsylvania, and particularly the State Forests, to a condition where they will support young growing crops of timber of good species which in the future will become enormously valuable, and a certain source of revenue for the public schools; that an appropriation for this purpose of $500,000 per year should be gladly and willingly made by the Legislature and approved by the Governor at the coming session and that such minor appropriations as are necessary for conducting the work of the Department be made in accordance with the recommendations of the Commissioner of Forestry, all of which should be in adequate amount and for that work which is necessary and incidental to the main work of the Department.—Unanimously approved.

No. 3.—Resolved, Further, that the members of the Wild Life League use their utmost endeavor to arouse in the minds of the citizens of Pennsylvania a greater and deeper interest in forestry and direct their attention to the achievements which have already been attained by this Department, results far in excess of those in any other State and second only to the undertakings of the National Government.—Unanimously approved.

No. 4.—Resolved, Further, that the investment thus far made by the Commonwealth in the business of practical and scientific forestry should not be wasted nor permitted to be frittered away for want of that support so necessary and essential for the continuation of the business, and without which support moneys thus far spent will avail but little. Unanimously approved.

No. 5.—Resolved, Further, that the Wild Life League, as an organization, is committed to the proposition of adequate support for practical and scientific forestry in Pennsylvania, and that it will exert all its power in an endeavor to bring about the results above stated, believing them to be necessary and fundamental for the healthful continuation of a work having the widest possible usefulness in the economic life of the State. Unanimousy approved.

The United Sportsmen of Pennsylvania also adopted a resolution with respect to forest fires at their annual meeting.

Forest fires. Resolved, That whereas, the forest is the basis of conservation generally, we call the attention of our legislators to the necessity of making provision for more adequate protection of forests from fire, and the employment of a suitable number of fire wardens with equipment to extinguish and prevent forest fires on all lands within the Commonwealth, either by suitable appropriation from the Treasury of the Commonwealth or by a system of taxation imposed on forest lands specially for such purposes. Also, That we recommend to the consideration of the legislators the plan of the Department of Forestry to ask an appropriation of one hundred and fifty thousand dollars for two years for the purpose of forest protection, this estimate to be based on one cent per acre per year for seven million, five hundred thousand acres.

Our fish, game and forestry departments. Resolved, That we commend the work of our Game Commission, our Department of Fisheries, and our Forestry Department during the past year, and that we renew our pledge to assist these departments in their work, and in the enforcement of their respective regulations.

RAILROADS.—Although it is still true that railroads are causing an unnecessary number of forest fires, and unduly holding up just claims for damages, yet it is also true that there has been an increase in railroad activities this year toward eliminating fire hazards and fire losses. Reports are being received to the effect that section men no longer have to be coaxed out to extinguish fires along railroads. Whether the fire started as a result of railroad operations or not, they are now at the scene of the fire as promptly as possible. Old engines have been discarded, and engine inspection has become more rigid. New equipment has been installed in order to lessen the possibility of sparks being cast out. Gasolene speeders are replacing the old hand car, and in several instances patrolmen have followed all trains in extremely dry weather. These conditions are not yet general, but are becoming more common. With very few exceptions during the year the railroads have not failed in the cooperation asked of them thus far.

On April 1, the following letter was sent to all railroad companies, and as a result definite instructions were issued to all employees on most of the roads:

Dear Sir: The maintenance of a forest cover upon our mountain lands has become one of the most important issues before the American public. To the railroad, especially, the preservation of the forest means:

1. A plentiful supply of ties, poles, and car lumber.
2. Freight, in the form of lumber and manufactured wood products.
3. Freight, in the form of supplies for lumber camps, sawmills, and manufacturing plants.
4. Good scenery, bringing in tourists and campers.
5. Hunting and fishing, which attract sportsmen to the regions forested.
6. Reduction of floods, droughts, and washouts, and expenses accompanying them.
7. Regulation and purification of water supply for shops and roadside water tanks.
8. Increased general freight through maintenance of general fertility of the farming region watered by the forest streams.

Forest fires which destroy not only present but future growth, strike at the very foundations of the welfare of the railroads of Pennsylvania.

During the year 1915 there were reported by our local forest fire wardens 1,101 forest fires. Of these, 274, burning over an area of 67,916 acres, are said to have been started by railroads. We feel that the number of fires can be appreciably reduced by the exercise of proper precautions. Furthermore, we are certain that cooperation between the railroad employees and the various local fire wardens of this Department must result in a great reduction of the area burned over by those fires which do start in spite of all precautions.

This Department desires to cooperate with you in every possible way. The spring fire season usually opens in April, and at this time we ask for your cooperation in a prompt issuance of general orders to all employees with respect to this matter.

B. F. P. Circular letter 9.

On July 19th the following letter was sent out:

Dear Sir: In order that your Superintendents of Divisions, section men, and other officials interested in the matter, may have in their hands a list of the forest fire wardens of the State so that forest fires may be reported to the nearest warden promptly, I shall be very glad to have you specify, if you will, the names and addresses of persons to whom copies of list should be sent and the number of copies to each person.

As a result of prompt replies of the companies and their willingness to cooperate with us in reporting fires, more names were received than we had lists of wardens, consequently it became necessary for us to send out the following on September 6:

Dear Sir: Owing to the fact that we are short two thousand copies of our forest fire warden roster it is impossible to send the number of copies requested by you. Under separate cover there will be sent you one or more copies of the Report of the Chief Forest Fire Warden for 1915. As a part of this report you will find a list of forest fire wardens. This list is not correct as the force is just being reorganized. Those names, before which numbers are placed, are, with a few exceptions, correct, but many additional men have been appointed whose names do not appear and a great many of the other names should be removed.

A new roster will be available at the beginning of the year after the reorganization is completed and then we hope to be able to supply you with the number you have requested and more if you need them.

In a number of instances, railroad officials came to this office or wrote to us to get complete lists of wardens along their rights of way, and in other cases lists were sent from railroad headquarters to each division superintendent.

On September 13, the following letter was sent to all railroad companies, and responses have been had from all of the large companies and many of the smaller ones:

Dear Sir: The forest protection code of 1915, P. L. 797, authorizes the Chief Forest Fire Warden to draft reasonable regulations for the prevention and control of forest fires along railways within the State of Pennsylvania.

In order that such regulations may be reasonable and as practicable as possible it is desired that the Department of Forestry be furnished with copies of all rules and regulations which you now have in force relating to fires along your right of way, clearing of right of way, dumping of ashes, inspection and handling of engines so as to prevent the throwing out or dropping of live coals, fire reports and fire extinction, in fact any rules relating to this subject. We also desire copies of any forms used in connection with these instructions.

It is our desire to be helpful wherever we can, and, with this end in view, we shall be very glad to receive any suggestions bearing upon the prevention and extinction of forest fires.

B. F. P. Circular letter 13.

It was hoped that these regulations could be classified and unified during this year, but other work prevented. This work now remains to be done during the next year.

The following letter from forester Chas. R. Meek, Coburn, Centre county, dated May 27, 1916 explains two important propositions in connection with railroad fires, viz., the difficulty of definitely attaching the fire to railroad operations, and the value of removing fire hazards along rights of way:

Relative to the fire report of May 6th we think that train No. 194, engine 1663, by Cherry Run tower 10:55 A. M. set this fire. As to the fire of May 9th we think train No. 132, engine 408, by Cherry Run tower 3:32 P. M. set this fire.

We have only circumstantial evidence as to these fires. I do not think any one saw the spark come out of the stack and fall in the leaves and set fire, unless it was at night. However, in working along a railroad a train will pass a crew of section men and a few minutes afterward they will see a small fire burning and, of course, attribute it to the engine. In these two cases the trains passed as usual and a little while afterward the section men noticed smoke and upon investigating found fire near the right of way. Certainly it *could* have started from some other cause. It is very possible. However, the probabilities are that the engine set it. This, too, is very possible and also very probable.

The section men must report and fight all fires arising from or near the right of way. This report is taken up by the supervisor of the division and an examination is made of the engine in order to see if it is defective. Mr. W. V. Betts, Supervisor No. 15 of Lewisburg, told me that in nearly every case the engine is found to be O. K. and the fire unpreventable by the apparatus used, if the engine did start the fire. All cases are investigated and every engine setting fire is examined.

It seems that railroad fires are a necessary evil as long as coal is burned on the engines that are not equipped with spark arresters that stop every spark, and also, a matter of equal importance, equipped with an extra guard ash pan to catch live coals dropping from the pan and striking a tie and flying many feet from the track. The firemen should also be prohibited from kicking hot clinkers from a moving engine or for that matter from any engine in a wooded district. Why is it necessary at all?

Mr. Betts informs me that the trains on this road are now equipped with larger engines and they do not need to puff so hard in order to draw the loads. The section crews, on account of the hard grades, will soon be equipped with motor cars capable of a speed of 50 miles per hour and will soon bring men after a fire is reported. These railroad fires cost the railroad company an enormous amount of money to fight. They pay their own men and this spring at one fire, May 10-13, we had six crews of section men present, coming from Glen Iron and Centre Hall to Paddy Mountain on their hand cars. At one fire last year a work train of men was made up at Montandon and run to Cherry Run. It seems to me that it would pay better to put more money in prevention than in extinction of fires.

Speaking of prevention, it might be well at this time to report what we have been doing to prevent railroad fires. In 1915, up to May 6th, we had eleven railroad fires that were reported to me, burning over about 350 acres, costing the fire appropriation $44.25, Forestry Department for forester's and ranger's time $54.40, the cost to the railroad company being unknown, and doing an estimated damage of about $500. This spring I got permission from numerous property owners along the right of way, including the Commonwealth, to burn a safety strip along the railroad varying in width from 20 feet to 100 feet wide. Nearly all owners allowed us to go ahead especially in the dangerous places. The railroad, nearly the entire distance through the woods here, has the mountain on one side covered with growth which is dangerous once it gets on fire. However, on the other side of the railroad, there is only a very narrow strip of growth until we meet Penns Creek about 100 feet wide. As there was little danger of a fire getting beyond control on the creek side, we decided to burn only on the mountain side of the railroad, except in one instance. I received permission from the Forestry Department to go ahead, and was allowed $75. I then went to Lewisburg and talked the matter over with Mr. W. V. Betts, the railroad supervisor. He agreed that the plan was a good one and offered to give me three crews of section men to do the work. I went ahead and with my men cleaned and cut the path and then set the crews to burning. We have burned about eight miles on the one side of the track but we are not yet through, but we have gone about as far as we can this spring as the trees are about green and there is danger of killing too many.

We had fires this spring but in every case they started from places not yet burned, and in one case on the side of the railroad that we did not intend to burn. In the fall we expect to go ahead and finish the work and then repeat every year in the fall. No fire, while burning the strip, was allowed to get beyond control. (There may be one exception to this but we are not sure.) Even if a fire did get away and burn a few acres or even more, I would not have considered it a failure as our method undoubtedly prevented numerous fires, any one of which might have done many times that damage.

> In 1916 we had five railroad fires, one unknown, but am sure it was fire of May 6th that broke out again but listed as unknown. They burned over 23 acres, damage $26, cost Bureau of Forest Protection to extinguish $17.55, Forestry Department for forester's and ranger's time $24.90, cost to railroad company unknown. On May 6th we had a railroad fire and put it out, and we had two light rains, one on the 7th and one on the 8th. On the 10th, fire started at 7 P. M. on the top of the mountain at the edge of fire of May 6th. The cause of this fire is unknown but I think it arose from the fire of May 6th. It burned 55 acres, damage $30, cost Protection Bureau, $65.28, Forestry Department for Forester's and ranger's time $18.00 to extinguish. We did not get this fire entirely out until the 13th as it broke out anew repeatedly and we had to keep sufficient men on hand all the time. The wind blew a gale. It is interesting to note that the railroad kept 31 men here for a total of 368 hours. We fed them when necessary.
>
> Of course, no conclusions or comparisons can be drawn from these figures as we had a fire season up here that was quite wet and very unfavorable to fire danger. Comparisons are odious anyhow as conditions are so varied, and even with extreme caution and preventive measures, conditions will arise that will perhaps cause great fire damage in spite of everything and throw all figures, calculations, and prospects to the four winds. Last year we had a very dangerous fire season and I think we did well to have only eleven railroad fires with but 350 acres loss, while from other causes we had over 4000 acres loss in two fires, and very much greater damage per acre.
>
> However, I still think our safety strip idea is a good one and one that we want to finish and continue. I think the railroad company and the property owners are to be commended, and if you think favorably of the idea, I can send you the names of those concerned and you could write them a letter thanking them, so that they know that even the people in Harrisburg have heard of their efforts and take interest in their undertakings.

Notwithstanding the difficulty in seeing the spark from an engine cause a fire, several companies have made their own investigations and when they have been satisfied that their engines were responsible for the fire, have promptly settled for damages and for fire extinction. There is no question but that this is the best policy for all railroads and we shall do everything we can to bring about an attitude which will result in prompt voluntary settlements.

OIL COMPANIES.—On July 26th, the following letter was sent to sixty or more oil and gas companies operating within the State:

> Dear Sir: We are endeavoring to obtain the cooperation of various companies and individuals who are directly interested in the prevention and extinction of forest fires. If your company owns or controls an oil pipe line which extends through forest areas, it is to your interest that any fires which may occur be extinguished promptly.
>
> This Department has under its direction a number of forest fire wardens whose duty it is to take steps immediately for the extinction of any forest fires which may arise. Our system of wardens is just about completely reorganized and a list of our fire wardens has just been published. A great many of the oil companies have patrolmen going back and forth along their pipe lines and it will be of considerable value to have these patrolmen know who the fire wardens are along their sections, and how they may be reached. We shall be very glad to send you, or to each of your patrolmen, a list of the fire wardens in the State if you will be kind enough to supply us with the names and addresses of persons to whom such list should be sent. With these lists in the hands of your employes, we shall be very glad, indeed, to have your cooperation in having any forest fires which may be discovered by any of your men reported promptly to the nearest fire warden.

Fourteen companies who employ pipe line walkers promised cooperation by having their men report fires to the nearest wardens.

PROTECTIVE ASSOCIATIONS.—The Department has continued its cooperation with the Pocono Protective Fire Association, the oldest association of its kind in the United States, and with the Central Pennsylvania Forest Fire Protective Association.

The Fourteenth Annual Report of the Secretary of the Pocono Association calls attention to the fact that the fire loss during the year is reduced considerably below that of previous years. Under the direction of the State District Forester there are twenty-nine forest fire wardens, and seven patrolmen during the dry seasons of the year. Attention is called to the need of additional patrolmen to cover the entire county of Monroe.

An effort was made to obtain an extension of telephone service within the county, but nothing could be done. The association built one mile of line to connect a tower at Cresco Heights.

"Forest protection has been aided by the distribution of warning posters throughout the county, and advertisements have been carried in the weekly newspapers, offering a reward of one hundred dollars for information leading to the arrest and conviction of any person who sets fire maliciously to woodlands."

Fifty-six new members joined the association during the year and a fair proportion of these were local land owners.

Arbor and Bird Day and other addresses were made by the secretary.

The fire wardens were entertained by a member of the Board of Directors.

A forestry exhibit was installed at the Barrett township fair.

Data for the Year Ending December 31, 1916.

RECEIPTS

Balance on hand, January 1st, 1916,	$288 07	
Assessments for previous years (arrears),	....	
Assessments for current year,	517 60	
Contributions in cash (directly or indirectly),	268 83	
Refunds from State,	674 53	
Value of contributions in labor or material,	....	
		$1,749 03

DISBURSEMENTS

Printing and stationery,	$72 94
Postage,	38 50
Secretary-Treasurer allowance,	63 91
Travel, telephone and telegraph charges,	....
Rewards for essays, etc.,	15 26
Towers and telephones,	69 42
Tools and equipment,	39 45
Patrolmen and observers,	1.090 50

Other outlay not itemized:			
Wardens' meeting,	3 80		
1,000 celluloid buttons,	14 30		
Exhibit at Fair,	6 78		
American Forestry Association,	3 50		
Affidavits,	1 25		
		29 63	
Rewards for convictions,		....	$1,419 61
Balance on hand December 31st, 1916,			$329 42

ASSETS

Cash on hand,	$329 42	
Unpaid assessments for current year,	20 00	
Unpaid assessments for previous years,	....	
Telephone lines,	55 07	
Tools and equipment,	36 75	
Supplies,	....	
Refunds from State (due),	32 75	
		$473 99

LIABILITIES

Outstanding bills for year's expenses,	None

Area of forested land within protected region,	140,000 acres
Area belonging to members upon which assessment is based,	21,000 acres
Rate of assessment per acre,	One cent
Number of members January 1st, 1916,	226
Number of new members added during year 1916,	44
Number of members on roll December 31st, 1916,	246

The Secretary of the Central Pennsylvania Forest Fire Protective Associaton reports that less than 1 per cent. of the area under supervision was burned this year. The loss by burning is the smallest in acreage and damage since the association has been operating. The average acreage per fire has decreased about 60 per cent., and the cost of extinction per acre was only 2.6 cents.

Six patrolmen and fourteen other fire wardens under the direction of one of the State foresters, who acts as secretary for the association, make up the protective force.

An extension of 1½ miles of telephone line was made to the 8½ miles already built.

About 45 miles of old roads and trails have been brushed out.

A fire break 5 miles long, 20 feet wide, was plowed, running parallel to the N. Y. C. Railroad. The space between the fire break and the right of way was burned.

The first annual meeting of fire wardens was held in March.

Special efforts were made to determine the cause of each fire. Out of 32 fires, the causes of all but four were definitely determined. All but four were preventable.

A large forest tree nursery was established by one of the members.

Some tools were purchased but there is need for many more.

Educational activities have included addresses before teachers' institutes, a forestry exhibit, posters, circulars, news items, etc.

Data for the Year Ending December 31, 1916.

RECEIPTS

Balance on hand,	$31 43	
Assessments for the previous years (arrears),	45 00	
Assessments for current year,	357 89	
Contributions in cash (directly and indirectly),	116 96	
Refunds from State,	134 68	
Value of contributions in labor and material,	117 13	
		$803 09

DISBURSEMENTS

Printing and stationery,	$64 93	
Postage and affidavits,	12 15	
Travel expense,	76 05	
Towers and telephones,	119 40	
Tools and equipment,	45 10	
Patrolmen and observers,	112 75	
Dinners at wardens' meetings,	14 50	
Office rent,	39 00	$483 88
Balance on hand Dec. 31, 1916,		$319 21

ASSETS

Cash on hand,	$319 21
Unpaid assessments for current year,	41 50
Unpaid assessments for previous years,	145 00
Towers and telephone lines,	456 24
Tools and equipment,	31 05
Supplies,	20 00
Refunds from State (due),	1 62
	$1,014 62

LIABILITIES

Outstanding bills for year's expenses,	None

Area of forested land within protected region,	300,000
Area belonging to members upon which assessment is based,	89,039
Rate of assessment per acre,	.005
Number of members January 1st, 1916,	32
Number of new members added during the year 1916,	2
Number of members on roll December 31st, 1916,	34

During the year the Pocono and the Central Pennsylvania Associations have entered into agreements with the Department. The general form of agreement, slightly modified in unimportant particulars to meet local conditions, is as follows:

This Agreement of Co-operation made and entered into this................day of ...., A. D. 1916, between the Commonwealth of Pennsylvania, acting through the Department of Forestry by Robert S. Conklin, Commissioner of Forestry, of the first part, hereinafter referred to as the Department and the ....

Association, a private voluntary agency or association in Luzerne county, Pennsylvania, having its principal office at ...., said county, of the second part, hereinafter referred to as the Association,

Witnesseth that. Whereas, by reason of an act of the general assembly of the Commonwealth of Pennsylvania approved the third day of June, A. D. 1915, P. L. 797, it is provided, *inter alia*, that the Chief Forest Fire Warden, with the consent of the Commissioner of Forestry, may enter into agreements with persons, firms, corporations, or associations, upon satisfactory terms, for the successful accomplishment of forest fire prevention or control (page 798, paragraph j); and

Whereas, by a further act of assembly approved the fourth day of June, A. D. 1915, P. L. 815, the Department is authorized to expend from its general forest fire appropriation for such protective and preventive purposes as it deems effective, a sum of money equal in amount to the amount which shall be expended by such agencies in accordance with agreements which may be entered into; which expenditures must be shown in monthly statements, to be audited and transmitted by the Commissioner of Forestry to the Auditor General who is then directed to draw his warrant for one-half of the amount of the expenditures shown in such monthly statement approved by the Commissioner of Forestry; and

Whereas, in the application and administration of said latter act of assembly it will be understood in any agreement to be made with such agencies, that said monthly statements required by law shall exhibit the expenditures which shall have actually been made by the co-operating agency and not sums which the Department by lawful authority may expend directly for the purpose therein provided: but which direct expenditure by the Department shall nevertheless be comprehended in and accounted for as a part of the equal amount which the Department is authorized to expend to meet the like equal amount expended by the association.

Now, therefore, in consideration of the foregoing and the sum of one dollar ($1.00) lawful money of the United States in hand paid to the Department by the Association at and before the sealing and delivery hereof, the receipt of which is hereby acknowledged, and in further consideration of the mutual benefits to be derived by the parties hereto in the exercise of the authority conferred by said acts of assembly, it is mutually agreed:

1. That the ....Association is a private agency whose activities in whole or in part are directed toward the prevention and suppression of forest fires.

2. That the Department will expend for and in behalf of the purpose for which said association exists, a sum of money from its general forest fire appropriation equal to that which shall be expended by the association for the purpose mentioned in the said acts of assembly.

3. Said expenditures by the Department shall be made in the following manner: That when the monthly statements of the Association are received, audited, and approved, the Department will request the Auditor General to draw his warrant in behalf of the Association for an amount equal to one-half of the expenditure shown by the statement, and approved as aforesaid.

4. That when the Department shall make expenditures directly for the purpose of the association and in furtherance of this agreement, said expenditures shall be taken into consideration in calculating the equal amount which the Department shall expend to meet the expenditure of the association.

5. That the Association shall render to the Department at the end of each calendar year a complete report exhibiting an itemized statement of all its expenditures for that year, duly verified by affidavit.

6. All expenditures of money made by the Association and reported in its monthly statement shall be accompanied by proper signed vouchers or receipts.

7. The expenses which may be incurred by the Association may include the following:

a All expenses incurred in the actual extinction of forest fires.

b The salaries of patrolmen or watchmen when their employment shall have been ordered or approved by the Department.

c The expenses of patrolmen or watchmen when necessarily incurred in the performance of their duty under their employment as patrolmen or watchmen.

d Expense incurred for the purchase of permanent forest fire fighting equipment which said equipment shall be accounted for by inventory in the annual report to be submitted at the end of the calendar year.

e Expense incurred in the building and equipment of telephone lines when said expenditure shall have been previously approved by the department.

f Expense incurred in the building and equipment of fire towers or observation lookouts when said expenditures shall have been previously approved by the Department.

g Expense incurred in the making and maintenance of fire line or fire breaks when they shall have been established under the direction of the Department.

h Expense incurred for educational activity which shall have immediate and direct reference to and connection with forest fire extinction, prevention, and control.

8. It is understood and agreed that other expenditures not herein specifically enumerated but which are immediately and directly made for forest fire extinction, prevention, or control, shall be regarded as legitimate expenditures of the association to be accounted for as aforesaid, provided that expenditures made in the giving of prizes for essays or competitions which shall be undertaken among school children or other groups of persons, in relation to the activities of the Association or the general subject of forest fires in its various ramifications, shall not be regarded as coming within the meaning of the foregoing acts of assembly or of this agreement.

9. It is contemplated that the funds raised by the association for the purpose for which it exists shall be derived from ratable assessments levied upon its constituent membership in accordance with the rules of the association, gifts of money made outright by friends of the association or its individual members, or from any other legitimate source from which money may be derived.

10. If at any time any of the constituent members of the association shall on its or their own account develop for personal private purposes a system of forest fire extinction, prevention, or control, the expenses of such constituent member or members so privately incurred shall not be regarded as a part of the expenditures of the association to be accounted for as aforesaid, or to be paid in part by the Department.

11. The expense of the Association shall be rendered upon blank forms to be furnished for this purpose by the Department and such statements must be submitted monthly. No expense incurred more than sixty days prior to the date of receipt of the statement by the Department shall be paid, as such payment is expressly excluded by law.

12. The annual report to be rendered at the end of the calendar year shall show *in extenso* every expenditure fully itemized which shall have been made by the Association for the purpose contemplated by this agreement. It shall show the source and amount of revenue obtained by the association, the value of the material purchased, or material or labor furnished in lieu of money by members of the association, or other assets of the association which it shall have acquired from time to time. The financial statement accompanying the annual report shall be made in accordance with an outline to be furnished by the Department.

13. Said annual report shall likewise exhibit a complete resume of all the work done by the association during the year. This is to include a statement of the total area covered by the protective measures of the association, the actual area owned or controlled by its constituent members and such other facts in relation thereto as shall clearly set forth the activities of the association for that year.

14 The association shall require its patrolmen or watchmen whether they be employed jointly by the Department and the association, or employed by the Department in furtherance of the purposes of the association, to make a daily record of their actions and observations, which said record shall be submitted by the association to the Department along with its monthly statement and upon a blank form to be supplied by the Department.

15. The association obligates itself to the Department to extend its protective influence and effort over as large an area as possible, and from time to time bring in as a part of its constituent membership such additional owners or controllers of land as it may induce to join and participate, the purpose of this activity being that the expenditure of money on the part of the Department shall be made for the purpose of diffusing the activities of the parties hereto over as large a forest area as possible in the region where the association shall conduct its affairs.

16. In case the subsisting forest fire appropriation allowed the Department shall be exhausted prior to the end of the appropriation period and the Department be unable to pay its ratable proportion of expenses to be submitted for payment by the association, this agreement to such extent shall be in suspension and abeyance, and the Department will use its best endeavors to procure a deficiency appropriation from the ensuing legislature with which to discharge such unpaid obligations.

17. By consent of the parties hereto this agreement shall continue in force until the first of June, A. D. 1917, and may be extended, modified, or enlarged in case only that the parties hereto shall mutually consent to the same.

In Witness Whereof the party of the first part has executed these presents by attaching hereto the seal of the Department of Forestry, and the party of the second part, in pursuance of a resolution of the Board of Directors of said association, duly adopted on the .... day of ...., 1916, has caused the same to be executed by its proper officers duly attested.

Signed, sealed, and delivered in the presence of us:

....
....

....
....

The Commonwealth of Pennsylvania
Acting through the Department of Forestry.

By ....
Commissioner of Forestry.

....
.... Association,

By ....
President.

Attest: ....
Secretary.

Largely through the efforts of District Forester R. Lynn Emerick, it was possible to present the subject of forest fire prevention to some of the timber land owners of McKean county. A meeting was arranged for and on the evening of September 8th the Chief Forest Fire Warden presented the matter to fifteen men. The work of the Department was set forth and the advantages of organization for forest protection purposes. A temporary organization was formed that evening, with Mr. Jos. Diem, Temporary Chairman, and Mr. C. H. Messerly, Temporary Secretary. A membership campaign was started at once.

On the evening of October 27th, a meeting was called to complete a permanent organization. As it was impossible for the Chief Forest Fire Warden to be present, he sent the following letter to be read:

> There is no question as to the necessity for protecting forests from fire, from any of the following standpoints.
>
> 1st. From the standpoint of the land owner himself who wants, or should want, his land to yield him the highest possible returns. These returns may be in general timber production or timber to meet some of his own peculiar needs. His timberland may be a protection to his home buildings, fields, or stock, or it may yield him some returns purely and simply because or its being the home of game or because it furnishes him some other personal enjoyment.
>
> 2nd. From the standpoint of the farmer, forest protection in his immediate locality and upon the water shed generally, within which his farm may be located, is a necessity because of the beneficial influence which well cared for forests exert upon local moisture conditions both in the atmosphere and in the soil, and because of the fact that forest fires do more to destroy insect eating birds than all of the other natural destructive agencies put together.
>
> 3rd. From the standpoint of the manufacturer who uses wood products as raw material, and of the wood user whoever he may be, forest protection from fire is of great importance because of the fact that fire is the greatest influence being exerted upon timber prices, the effect of which is to force the price constantly higher and higher.
>
> 4th. From the standpoint of any individual who is interested directly or indirectly in water power, forest fire prevention is a necessity because there is no other natural force which exerts so great a beneficial influence upon the regulation of stream flow as a well preserved forest under which there is a well developed forest litter.

5th. Every individual who is interested in a pure water supply, either for himself or for his own community or for other communities in which he is interested, must realize the importance of the prevention of forest fires because there is no other natural factor which acts so beneficially in the storing of rainfall, in its purification, and in furnishing a regular supply of potable water.

6th. From the standpoint of the sportsman, forest fire prevention is necessary because forest fires do more to destroy the game of a region than all of the hunters put together.

7th. From the standpoint of the tourist who desires to travel through beautiful mountain scenery, forest fires must be suppressed. They leave in their wake nothing but desolation. And it may be stated here that Chambers of Commerce and other bodies interested in bringing money into their communities may do well to look to the tourist trade as a ready means of attracting much money into the lines of business represented in their communities.

There are many other classes of people who might be mentioned that may be seriously affected, directly or indirectly, by the results of forest fires, especially the laboring man, and from these smaller groups we may go immediately to community groups, township, county, and the Commonwealth. The individual timber land owner is not the only one by any means who benefits by forest protection and proper forest management or who suffers as a result of forest fire and bad management. The Commonwealth of Pennsylvania for years has recognized these facts and has made various efforts to assist the individual in the protection of his forests from fire. Unfortunately, these efforts, in the main, have not been successful. We have had law after law in the statute books, but without the backing of public opinion and without a proper enforcement of the law where it might have been enforced, practically nothing was done. Even now when a satisfactory law is in effect and an effort is made to carry it out, the Commonwealth has not contributed a sufficient amount of money to make possible forest protection as it should be carried on, and it is a very large question, indeed, whether the Commonwealth ever will contribute enough money to entirely eliminate this tremendous curse which hovers over its welfare. There are certain considerations in the question of forest protection which prompt us to believe that because of the individual benefits received, the owner himself should be induced to do something for his own protection, also that the Commonwealth should do something for the protection and the benefits which it receives, and further, because individual protection is practically impossible of accomplishment without the co-operation of adjoining land owners, we believe that the best results can be obtained through the organization of a co-operative protective association made up of timber land owners and others in various communities interested in the protection of the forests. This association will, to a very large extent, work out its own protective measures, and because of the personal interest which each member has in the activities of the association, the expenditure of money undoubtedly will be most carefully supervised and a dollar's worth of returns will be expected for each dollar expended. Through such an association the Commonwealth is willing to contribute its share for the protection of forests within the region covered by the association's activities, and the expenditure of the State's money may be made by the directors of that association or their proper agents.

The activities of such an association, of course, largely would be in accordance with plans that have been approved by the officials of the State Department of Forestry. This does not mean, however, that the association could not carry into effect any measures which were not approved by the State officials. It simply means that for all expenses approved by the Department of Forestry, the association would be reimbursed for an amount up to 50 per cent. of the total. As for example, if the association, with the approval of the Department of Forestry, thought it necessary to employ five patrolmen during the spring fire season at an expense of $500, the association through its officers would recommend the men who were to be employed and the salaries which were to be paid, and to a large extent would determine the region over which each patrolman was expected to travel. The Department of Forestry would ask the patrolmen to make certain reports and to perform the duties of a forest fire warden as now provided by law, and as such, of course, would come directly under the supervision of this Department. Such supervision in McKean county has been carried out under the direction of Mr. R. L. Emerick, of Coudersport, who is our district forester for Potter and McKean counties. Upon presentation to the Department covering expenditure for salaries of the patrolmen, the Commonwealth would reimburse the association to the amount of $250 which would, of course, go into the association treasury and would be available for subsequent expenditures.

The value of the association, then, may be stated about as follows:

1st. It brings together the people of a community who are largely interested in forest fire prevention.

2nd. It makes possible a better protection of the forest within a definite region because of a better system than can be worked out by individuals scattered here and there over the territory.

3rd. It makes possible a greater return for the money expended by the individuals themselves.

4th. It makes possible a means for local education against forest fires which is more effective than any system of education which might be conducted from the State Department. In other words, such an association will create local public opinion which will be against forest fires and for the enforcement of laws relating to forest protection.

5th. It makes it possible for the State to do its duty to local forests which under other circumstances it simply could not do because of lack of appropriation, and because of a lack of means to create the necessary public opinion for proper forest protection.

Finally, it means the actual elimination of forest fires, a thing which is practically impossible without organization and co-operation either on the part of individuals themselves or by the Commonwealth itself.

Mr. Emerick was present and cleared up many questions which arose.

Mr. Diem and Mr. Messerly were elected President and Secretary respectively. The organization is to be known as the McKean County Protective Fire Association. The constitution and by-laws adopted were substantially the same as those of the Pocono Association.

The Secretary's report follows:

Data for Year Ending December 31, 1916.

RECEIPTS

Assessments and dues for current year,	$102 49	
Refunds from State,	17 04	
		$119 53

DISBURSEMENTS

Printing and stationery,	$24 12	
Postage,	13 00	
Secretary-Treasurer allowance,	20 00	
Affidavits,	50	$57 62
Balance on hand December 31st, 1916,		$61 91

ASSETS

Cash on hand,	$61 91	
Unpaid assessments for current year and dues,	32 66 Plus	
Refunds from State (due),	11 77	
		$106 34

LIABILITIES

Outstanding bills for year's expenses,	None

Area of forested land within protected region,	?
Area belonging to members upon which assessment is based,	11,056 Plus
Rate of assessment per acre,	One cent
Number of new members added during year 1916,	26
Numbers of members on roll December 31st, 1916,	26

By the word "Plus" is meant that some of the members have not to this date given in their acreage upon which to base assessment.

As a result of several inquiries as to the possibilities of individual corporations co-operating with the Department for a better protection of their forests from fire, a meeting was called at Hazleton on September 29th. Representatives of eighteen companies owning timber land were present. The Chief Forest Fire Warden stated the purpose of the meeting and set forth some of the reasons for organized efforts against forest fires in the anthracite region. Dr. W. R. Fisher, Secretary of the Pocono Protective Fire Association. spoke of the work which his association has been doing in Monroe county. Dr. H. S. Drinker, President of Lehigh University, spoke of the necessity of forest protection. Hon. I. C. Williams, Deputy Commissioner of Forestry, spoke of the importance of a local organization in educational work and other protective activities. Those present expressed their various opinions as to the necessity for and the importance of fire prevention. Mr. H. C. Wiener, Forester for the Lehigh Valley Coal Company, acted as temporary secretary of the meeting.

A resolution was passed to the effect that the Chief Forest Fire Warden appoint a committee to draw up a report setting forth the present conditions of the region, what ought to be done, etc., which report should be presented to a subsequent meeting and then submitted to corporation officials and other timber land owners.

The committee consisted of:

Dr. Henry S. Drinker, President of Lehigh University.

L. W. Conrad, Supt. Timber Dept., Reading Coal & Iron Co.

A. C. Neumuller, Forester, Lehigh Coal & Navigation Co.

H. C. Wiener, Forester, Lehigh Valley Coal Co.

James E. McNeal, District Forester, Pennsylvania Department of Forestry.

George H. Wirt, Chief Forest Fire Warden.

An outline for a report, and later a detailed report, was drawn up and submitted to each of the other members of the committee.

The committee met at Reading in the office of James E. McNeal, December 29th, to consider the report. It was approved, except that certain additions was requested. These changes will be made and a meeting called for a temporary organization early in 1917.

PUBLICITY

We believe that the solution of the forest fire problem in Pennsylvania is in a constant and vigorous campaign of education upon the subject. The Commissioner of Dominion Parks, Canada, states:

> For practical purposes there are only two kinds of fires—man-caused and those resulting from lightning. The latter we cannot prevent but in regard to the former there does not appear to be any good reason why a great deal cannot be accomplished. I do not admit that one fire in 10,000 is started maliciously. Practically all are caused through ignorance and carelessness. It is the old story, "I didn't know it was loaded." The obvious course to follow then is to endeavor to educate every man who may by any chance go through the woods to guard against doing anything which may start a fire.
>
> People have been educated to recognize the necessity of pure air; people have been educated to suffer the isolation of their loved ones in cases of contagious disease. Surely there is no reason why they should not also be educated to be careful in regard to forest fires.
>
> I think those who have studied the psychology of it, agree that men are influenced most by affirmation and reiteration. If a statement is affirmed vigorously enough and reiterated often enough practically all men finally accept. There is no better vindication of this fact than the methods and the success of patent medicine men. You all know how they affirm and reiterate. Just think of the influence their campaign has on everyone of us. There is scarcely a man present, I will venture to affirm, who talking ordinarily with contempt for patent medicines, has not on occasions when he found himself pale or out of sorts, gone to a drug store and purchased some remedy that he has seen blazoned in the newspapers and on the bill boards as being good for pale people. It is simply a case of the efficacy of affirmation and reiteration.

It has been our policy this year to reach a number of classes of people directly interested in fire prevention. Circulars have been sent to our wardens, to game protectors, to timber cutters, to railroad companies, to dealers in sporting goods, to ammunition manufacturers, and to pipe line companies.

Forest fire wardens, game protectors, and dealers in sporting goods, and others have distributed our forest fire literature. There were distributed during the year.

About 156,000 forest fire stickers.

About 60,000 Forest Fire Facts (a two-page circular).

About 56,000 Carelessness vs. Good Citizenship (four-page circular).

About 60,000 four-page circular for school children.

There were also distributed 3,000 copies of the First Report of the Chief Forest Fire Warden, being a report on forest fires in Pennsylvania for the year 1915. Five thousand copies had been ordered. The mistake in number printed and the fact that they were not received until July 14th, after the spring fire season, prevented the possibility of doing some good publicity work at a proper season.

Whenever a forest fire warden has given definite information as to the cause of a fire, the individual or company responsible has been written to. To persons whose land is reported as having been damaged, the following form has been mailed:

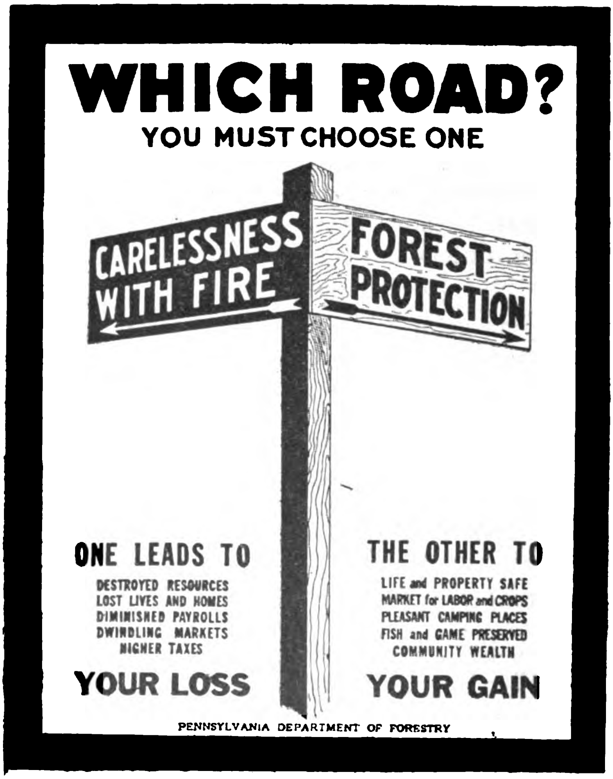
Dear Sir

Our forest fire warden, ... has notified us that on .... a forest fire burned in ....township, ...county. He is informed that your woodland has been damaged.

The Department of Forestry is doing its best to suppress forest fires and needs the support and co-operation of every timberland owner. If you can furnish information as to the cause of this fire, sufficient to bring to justice the one responsible for it, the Department will refer the matter to the Attorney General for legal action. Conviction cannot be obtained on anything but exact statements of fact. If you and your neighbors will help us we believe we can make your woodlands one of the safest and most profitable of your investments.

B. F. P. Form 6

On the address side of this card appears the following cut, which was copied from a poster published by the Western Forestry and Conservation Association of Portland, Oregon.



News items have been given to papers by our wardens and seventy-six news items relating to forest fires have been sent out by the Department Bureau of Publicity. County lists of wardens were published in newspapers previous to the fall fire season.

Various reports, papers, and addresses have been prepared, a list of which may be found elsewhere. The foresters of the Department have done a great amount of work of this kind, and in a number of instances local fire wardens have made addresses before the schools of their neighborhood.

Through the efforts of the Department Bureau of Publicity, in charge of forester N. R. McNaughton, arrangements were made whereby we could have a motion picture film entitled "The Curse of the Forest."

"This two-reel motion picture of a forest fire that actually burned was taken in May on the Mont Alto State Forest by the Department of Forestry in co-operation with the Vitagraph Company of America. The scenario was written by two of the State foresters, all the actors in the picture, with one exception, are men of the Pennsylvania Forest Service, and every scene of the picture but one office scene was staged by the Department in Pennsylvania. Not an inch of the two reels is faked.

"The picture is a story of forest protection in Pennsylvania as it is and as it might be. The first part shows present Pennsylvania conditions. The picture opens with a lone ranger in a high tree-top, looking over a vast forest area in fire season. Rangers are few, and no money is available for modern steel towers, so the ranger adds to his effectiveness as much as he can by using high trees for observatories. While the ranger is in the tree a camper some distance away breaks camp and starts for home. He does not extinguish his camp fire properly, and, to make assurance doubly sure, he throws his cigarette butt into the dry leaves and passes serenely out of the story. But his work goes on just the same. The camp fire spreads, the cigarette does its duty nobly, and in a few minutes half a mountain side is blazing. The ranger sees the smoke, and, hoping that he can handle the situation alone, goes to the fire but finds it far too much for one man. And he is five miles from the nearest help and there are no telephone lines! He runs to the forester's office, a rough shack at the edge of the settlement, and arrives exhausted. The forester hurries out for help, and, in the course of an hour more manages to get five men. With this inadequate crew, and with scarcely any tools but axes, they start for the fire, now a raging conflagration, with a single team and over the roughest of mountain roads. They realize that the hours between the time the fire started and the time of their arrival on the scene have given it a tremendous advantage, but they attack it gamely nevertheless. Time and again they win a little ground only to lose it because they are too few to guard what they have gained. The fire sweeps past their defenses time after time, and they are forced to fall back and start all over. After three days of the severest and most disheartening kind of work rain mercifully puts an end to the fire,—after half a township has been devastated.

"The second part is a picturization of the modern fire-fighting system Pennsylvania might have. Money makes the difference. The picture opens with a ranger on a steel tower equipped with a telephone. The camper has been educated to be careful with fire in the woods. He extinguishes his fire properly, and empties his pipe ashes in damp mineral soil. But accidents will happen, and sparks from a burning house in the forest start a fire. With his binoculars the ranger sees it almost at once, and telephones its direction to the forester. Reports are received from the other rangers, and the fire is located at the forester's office without the stirring of a foot. Help is summoned at once by telephone, and in little more time than it takes to tell it twenty men are on their way to the fire on horseback and in automobiles, equipped with modern tools. The roads they traverse have been transformed into real highways, and as a result of efficient methods all along the line the men arrive at the fire while it is still small. Because of their adequate equipment and number there are no "flarebacks" at this time, and in a very few hours the fire is over and the men are on their way home. And the final contrast is that only twenty acres are burned instead of several thousand.

"Many exciting incidents occurred while the picture was being taken. A miniature whirlwind came up a few minutes after the fire started, and the flames traveled over the tops of the pines in the nearest approach to a crown fire the South Mountains have seen for many years. Several of the men had narrow escapes, and one, who was forced to run through the flames, was unconscious for several hours. The camera man, in an effort to get a near view of the fire from a wagon, was almost encircled by flames, and was forced to run for his life. He succeeded in getting a "close-up" of a narrow escape of part of the fighting crew."

We have more requests for the film than can be filled and already it is wearing out rapidly. Several copies should have been had at first. A rare production will be lost forever if efforts are not made immediately to have some sort of duplication of it made.

Just before the end of the year, 2,500 copies of a poster setting forth the main points in the forest fire law were printed. These will be sent out to post offices early in the coming year.

The following circular letters were sent to all State foresters:

B. F. P. Circular letter No. 7.

March 6, 1916.

To All Foresters:

Fire Rakes.—Please notify this Bureau how many 4 or 6 tooth rakes you can use.

Fire Torches.—Please notify this Bureau how many pipe torches you need. The torches are about 3.5 feet long, weight 7 pounds, and will burn for seven or eight hours. Kerosene and lard oil, mixed, is the fuel used.

Publicity.—Whenever a fire occurs in your locality, send information promptly to all county papers, giving, if possible, the cause and the approximate damage, as well as any local items of interest. In case of a fire of any size, send description at once to N. R. McNaughton.

Meeting of Fire Wardens.—Rangers may attend any of these meetings, but if they do so, it must be at their own expense for the present.

Telephone Exchanges and Directories.—Get your county list of fire wardens posted at all telephone exchanges in your region and induce wardens who have telephones to have "fire warden" printed after their names in the telephone directory.

Fire Bills.—In case of small fires, where immediate payment is not called for, fire bills may be held to the end of the month. In other cases, forward bills without delay.

Expenses incurred in connection with forest fire business should always be kept separate for each county concerned.

Fire Report.—On the report (Form 15) of a fire at which a forester or rangers spend some time, always enter the amount charged for such time, at their fixed salary service rates so that we may have a complete record of what it costs to extinguish the fire. Give cost of extinction to private individuals or corporations whenever you can.

Duplicate copies.—In accordance with the rule to keep copies of every bill or report sent from your office, do so in the case of fire bills and reports. Identify all papers with your name and date.

Payment of Fire Bills.—If you can arrange satisfactorily with forest fire wardens, have them submit facts to you and you make up the bills and reports in your name. It is preferred, however, that each fire warden who has directed the extinction of a fire make up his bills and reports in his own name. His bills and reports will be submitted by him to the forester. The forester will audit them and if correct, approve them and forward them to Harrisburg. The fire check will be made out in the name of the fire warden and forwarded to him through the forester. The forester can arrange to have the check endorsed to him by the forest fire warden and can make up the individual checks, to be distributed by the fire warden. Use whatever method is most satisfactory for your conditions.

The forester is the head of the fire service in the region where he is stationed. He must at all times impress this fact upon those with whom he has to deal.

Fire Hazards.—Make a study of the fire hazards upon your own forest and in the adjoining country. Determine the relative degree of risk, how hazards may be reduced, and report to this Bureau. Do not limit your reports to your own district. Whenever you observe any unsatisfactory condition anywhere in the State, report the matter at once. Reports should be accompanied by sketches or maps.

Cause of Fires.—Information concerning the cause of each forest fire should be obtained in detail as far as possible, giving name and address of person or agency responsible, names and addresses of witnesses, what facts each may be expected to swear to upon the witness stand, and anything else that may be of value in preparing a case for prosecution. We must have STATEMENTS OF FACT and not inferences or suppositions.

B. F. P. Circular letter No. 12.

September 1, 1916.

To All Foresters:

Do you have copies of any county maps issued by the State Highway Department? If you have, indicate the county or counties. If you need such maps, indicate by county what you want. Forward your reply on the inclosed card at once.

The fall fire season will soon be here and it is important that all your equipment be gotten in shape and available for immediate use. Get in touch with as many of your fire wardens as you can and keep them alive to the necessity of prompt action. Have your own local organization worked out and get the fire wardens to follow your example.

Encourage co-operation for fire prevention and extinction wherever you can.

If you have any forest fire literature, use it. If you want more, let us know.

Suggestions for the betterment of the service are always in order—let us have them. We desire in particular a lot of good suggestions for insertion in a Forest Fire Wardens' Manual. You have fought a number of fires. Make diagrams of the fires, indicating as well as possible topography, and wind. Show how you attacked them successfully or unsuccessfully. Make such diagrams, if possible, for all subsequent fires and submit them with your fire report. In this way we ought to get some valuable information.

B. F. P. Circular letter No. 17.

December 22, 1916.

To All Foresters:

Inclosed is a copy of a poster which we are permitted to place in the post offices of the State. With the aid of your Smull's Handbook, make a list of the post offices in the protective region which you control. Under each post office list the fire wardens who get their mail there or who will control fires which may be observed by persons getting their mail there. If there are post offices lying in another forester's territory whose patrons can notify your wardens, please include these in your list. We will eliminate duplications in this office.

We desire to have these lists just as soon after January first as possible. All lists should be in this office before January 20, 1917.

The following circular letters were sent to all forest fire wardens, including foresters:

B. F. P. Circular letter 6.

February 1, 1916.

Forest fire wardens should note the following items:

1. Bills (Form 16) must reach Harrisburg WITHIN 60 DAYS after they have been incurred or they will not be paid.

2. Bills (Form 16), receipts, and reports (Form 15) must be written in ink or upon a typewriter. Typewritten bills (Form 16) should be submitted in duplicate.

3. Receipts must be made out in your name and signed by the person rendering service.

4. Amounts for which receipts are obtained must be placed upon the forest fire bill (Form 16) before it is totaled.

5. No amount exceeding 25 cents will be approved for an affidavit fee.

6. Wardens who have received certificates of appointment are entitled to 30 cents per hour. Those who have not received such certificates are entitled to 25 cents per hour in the case of district wardens, and 20 cents for assistant wardens.

7. Employes may be paid not in excess of 15 cents per hour.

8. In computing amounts due a man, no fraction of a cent should be placed in the amount column. An extra cent should be allowed in case of ½ of a cent or more. Anything less than ½ cent should be dropped.

9. On each report (Form 15), you should divide your time charged into two parts: the time you spend fighting fire, and the time charged for other work in connection with that fire.

10. A separate report (Form 15) should be submitted for each fire that comes to your attention, no matter how small, whether you have been present or not, and whether there has been any expense to the State or not. We are anxious to get complete and accurate reports.

11. If more than one warden attend the same fire, you should consult with each other, and decide which one should make up the bill (Form 16) and report (Form 15), making sure that the warden who submits the bill and report has all the information necessary from the other warden.

12. If a State forester is at a fire, State forest rangers and forest fire wardens should report all matters to him and he should make out the fire bill (Form 16) and report (Form 15).

13. In case a State forester is not at a fire upon his forest or in his neighborhood and it is extinguished by a ranger or a fire warden, the report (Form 15) should be made out by the ranger or fire warden in attendance. The information necessary for making up the bill (Form 16) should be given to the State forester and the bill be made out by him.

14. When a fire has burned in more than one county, the acreage, loss, and expense should be apportioned between the counties. A separate report (Form 15) should be made for each county.

15. Expenses for more than one fire may be combined in one bill (Form 16), but those for each fire should be kept separate according to date, entering the earliest fire first upon the form. In this way, time and expense in making affidavits may be saved. Do not overlook item No. 1.

16. You should caution those whom you meet against the careless use of fire.

17. The people of your community should be kept informed as to the fact that you are a forest fire warden. Ask the rural mail carrier to notify you when he knows of forest fires. It is a part of his duty to do so. Those who use printed stationery, bill heads, etc., should have their title of forest fire warden included in the printing.

18. Employes must be paid by check as the law requires.

19. Employes should be notified to call for their checks, or the checks should be sent by mail when it would otherwise require extra time of the fire warden to deliver them.

20. Individuals extinguishing forest fire without first having been called upon by a fire warden, should submit their claims to the warden WITHIN ONE MONTH.

21. Forest fire wardens located along the border of the State should always make special mention of the fact when fires originate in the adjoining State and burn across the line into Pennsylvania.

22. Estimates of the area burned over and damage done must be more nearly accurate than they have been in the past.

23. This Department should be kept informed of changes of location, post office address, or telephone number, affecting fire wardens. When you are unable to attend to your duties, the Department should be notified promptly.

24. In correspondence with this office, you should always write your title after your name and then give the township and county for which you are listed.

25. You should send to this Department newspaper clippings coming to your notice upon the following subjects: forest fires, forest destruction, floods, droughts, failure of water supply, and any other matter closely related thereto, occurring within Pennsylvania. On clippings sent in, give name of paper from which taken, and date of issue.

26. Foresters should always stamp bills and reports coming through them with their "approval" stamp and countersign them.

27. On the back of your report (Form 15) draw a rough sketch of the township or townships in which the fire occurred, showing approximately the location of the fire.

28. A report on forest fires in Pennsylvania will soon be published. When you get a copy read it, and if you know of others who would read it, send us their names.

September 26, 1916.

To All Forest Fire Wardens.

By the time this letter reaches you the FALL FIRE SEASON will be on, and the following suggestions should be noted carefully.

1. Inclosed are copies of circulars now available. Wide distribution of this literature is desirable. If you can use any to advantage, write us giving title and number desired. Circulars may be posted at various places, or distributed to sportsmen, school children, and others.

2. We have received promises of co-operation from the following: Game wardens; fish wardens; and sportsmen generally; State Highway engineers, superintendents, foremen, and patrolmen; railroad men; pipe line walkers; oil and gas men; rural mail carriers; and Boy Scouts. Help these people to co-operate with us by making yourself known to them and ask them kindly to report fires to you as soon as possible. Get in touch with telephone centrals and ask them to call you promptly when forest fires are to be reported.

3. Don't fail to organize a local forest fire crew in each danger section if it is possible. See from two to ten good men and have it understood that they will go immediately when a fire comes to their attention.

4. Send bills and reports promptly. Don't forget that bills cannot be paid if received after 60 days from date of fire. Notice of fires should be sent promptly to your local newspaper.

5. Considerable difficulty has arisen this past year because of inaccuracy of statements as to causes of fires or because the information was not complete. Please give complete and exact information as to cause of fire.

6. Don't forget to send a report (Form 15) for each fire, even though there may be no bill for its extinction.

7. Some unfavorable criticism has come to headquarters this year to the effect that some wardens have not arrived at fires promptly and that employes have been allowed to take things easy on the fire line. We understand the circumstances under which such criticism is unjust, but we ask our wardens to be careful in these matters.

8. A number of our wardens have received a circular letter from Washington, D. C., asking them to join the American Forestry Association, and offering membership, certain books, and advice upon the payment of $3.00. That letter was not written upon our advice or with our knowledge and wardens are at liberty to pay no attention to it if they so desire. Membership in the Association, the magazine, and the book are worth the price, but we have a Pennsylvania Forestry Association which supports our work. Membership, including its magazine, costs $2.00 per year. If any forestry association is joined by our wardens, preference should be given to the one in our own State. Membership in any association, or subscription to any magazine, is not required.

B. F. P. Circular letter 14.

Three thousand two hundred copies of the following circular letters were sent to timber cutters:

May 1, 1916.

Dear Sir: In 1860, Pennsylvania stood first in the list of timber producing states. In 1910, she stood fourteenth with a cut of over one and a half billion board feet. According to estimates for 1915 she is now cutting less than one billion board feet and a large part of this is in the form of poles, ties, mine props, and cord wood. When the comparatively small supply still remaining in our scattered virgin tracts is exhausted, the cut will drop to less than one-half billion board feet annually. Had our forests been protected from fire after lumbering we could still be cutting yearly from two to three billion feet, and would have the prospect of continuing to cut this amount for all time without any further worry on our part, so long as the fires are kept out. If, in addition to that, we should undertake to practice scientific forestry, this cut could easily be doubled.

As a timber cutter of Pennsylvania, a man whose business depends for its very existence upon the maintenance of a forest cover upon our mountain lands, is this not of vital interest to you? What are you doing to protect your interests?

The annual loss to timberland owners of Pennsylvania through forest fires is fully $5,000,000. The loss to the persons who would be employed in the cutting of this timber that we will not allow to grow amounts to several times as much. You share it! To offset this tremendous loss the 1915 legislature appropriated $45,000 to cover a period of two years. Evidently little preventive work can be done with this sum, even though "an ounce of prevention is worth a pound of cure."

On September 1, 1915, the new Bureau of Forest Protection began work under an act passed by the last legislature. At the next session an appropriation of $75,000 per year will be requested. This is about one cent per acre for the total area protected, and is only a fraction of one per cent. of the annual loss suffered by the timber cutters of Pennsylvania. Are you sufficiently interested in your own property to ask the members of the legislature from your district to support adequate appropriations for this work?

B. F. P. Circular letter 11.

The following circular letter was sent to 600 dealers in sporting goods. 165 replies were received and all of them expressing an interest in forest protection and a desire to be of help in the work. Two hardware men asked for window displays showing the loss resulting from fires. The Bureau of Publicity is now working on such a display. It will be available early next year.

October 21, 1916.

Dear Sir: We believe you are interested in good business today, tomorrow, and for the future indefinitely. Forest fires in this State have already destroyed much business and will continue to do so as long as they are permitted to rage. There is certainly some point of contact which you have with the forest which should arouse or maintain your interest in forest protection.

We are therefore inclosing some forest fire literature to be used especially on or in packages purchased by sportsmen or others going into the woods. The stickers may be used to seal small packages and do away with the necessity of using cord. They can be stuck on cartridge boxes, etc. The use of this literature by you will do much in your community toward advancing public opinion against forest fires. If you can use more to advantage, kindly let us know. If you do not care to use them, please do not throw them away but hand them to some one who is interested.

B. F. P. Circular letter 15.

The following circular letter was sent to five large manufacturers of ammunition sold in Pennsylvania.

May 30, 1916.

Gentlemen: This Department is endeavoring to do everything it possibly can to prevent the burning of forests and we are asking and obtaining the co-operation of all classes of people. However, educational activities must be continued and suggestions must come from every possible angle. We know that you people furnish a great deal of material for the use of Pennsylvania hunters. The hunters themselves are interested in the protection of the forests, however, at times are rather careless. For several seasons in a great many portions of the State we have been supplying cartridge dealers with stickers, such as are inclosed, to be placed upon packages obtained by hunters at the stores. We believe that some satisfactory results have been accomplished. We do not want to make any request upon you which will necessitate any financial burden but we would like to know whether or not it is possible to obtain any sort of co-peration in the way of having some item with respect to the necessity for carefulness in the use of fire in the woods either upon the outside of the cartridge box or upon a separate piece of paper to be placed inside of each cartridge box. Is there any way in which you can help us or we can help you in this matter?

I believe, as a matter of fact, that preservation of the forests, and consequent preservation of game, is a direct benefit to you, for certainly with a decrease in game you would begin to have a decrease in sales within the borders of this State.

The Remington Arms U. M. C. Company and the Peters Cartridge Company were the only ones who would do anything. The others believe in the proposition but could do nothing to help. The Remington Company are publishing our news items in their "Live News" which is sent all over the United States. They also promise better things in the near future. The Peters Cartridge Company furnished us with a list of their dealers and through them we got in touch with sporting goods dealers. We call the Sportsmen's attention to the two compaines who are willing to help protect the forests.

One manufacturer of tents, camp outfits, and supplies, is using our stickers.

The following is the contents of Department Circular 17 issued under the heading "Carelessness vs. Good Citizenship or Who Pays the Freight?":

What Forest Fires Do in Pennsylvania

Fires cause the loss of human lives. While the number of lives lost directly from this cause in Pennsylvania is small, yet some people have been burned to death and no one knows how soon others may be.

Fires cause the loss of homes. Not infrequently have forest fires furnished the spark that burned the house and possessions of families living within or near a forest.

Fires cause the loss of fences, sheds, crops, stock, etc.

Fires cause the loss of felled timber. Felled trees represent time and money. The further the process of manufacture is carried the more valuable the product. Every year thousands of dollars worth of logs, bark, cord wood for various purposes, ties, poles, posts, and sawed lumber is destroyed. The workman may be out his time or wages; the owner may be out the wages paid and the profits; the user must so much the sooner pay a higher price for his wood because the supply is decreased by just so much; the Commonwealth at large suffers because property is destroyed, everybody concerned is made poorer, and no further wages, taxes, or use are possible.

Fires kill much growing timber. Fire burns the bark of trees and heats the wood immediately below the bark. The living layer of wood is just beneath the bark. If the cells of this wood are heated to a sufficient degree they cease to do their work. If the tree is small, the fire, hot, or the species a sensitive one, the tree is practically girdled and dies. Where leaves and brush are piled around trees, the fire may be sufficient to burn through or to make such a scar that the first strong wind will blow the tree down. Some trees are more sensitive than others. White pine, especially young trees, and beech are very sensitive. Pitch pine is very resistant. When the pines are killed by fire, roots as well as stem are dead, whereas most hardwoods may be killed above ground but remain alive below and send up sprouts again. Spring fires are more disastrous than fall fires.

Fires injure much growing timber. When the trees are large or the bark heavy and the fire light, not many trees are killed, but the majority are injured. The trees are only partly girdled, bark drops off on one side of the base, insects and fungi begin work, and succeeding fires continue to eat into the tree and finally destroy a good part of it or kill it.

Fires destroy seeds, small seedlings, and sprouts. Upon the forest floor, mixed with leaves and humus are many tree seeds of various kinds waiting for favorable conditions to germinate and grow into trees. In most cases where stock and fire have been kept out of woodland for several years, there are thousands of young trees started, but are hardly noticeable. Fire destroys all of these, as a very small amount of heat will destroy the germ within a seed, and cook the life out of the tender plants. Even the lightest fires do considerable damage in this way, destroying the germs of prospective forests.

By reason of the last three effects of forest fires, repeated burnings may change entirely the character of a forest in almost all of its phases, or forest conditions may be destroyed totally. The better species of trees may give place to fire cherry, quaking aspen, birch, or other light winged species. All tree growth may give place to scrub oak, sweet fern, huckleberry, bracken, or common annual herbaceous weeds. So it is reasonable to say that forest fires destroy forests and the possibilities of future forests.

Fires destroy, wholly or in part, the litter and humus on the ground within the forest. Light fires burn some leaves and small branches. Heavier fires burn everything down to mineral soil, some even following roots and other vegetable matter into the soil.

(a) Forest litter and humus are a mechanical hindrance to the run-off of precipitation, allowing water to reach the stream slowly.

(b) Humus absorbs and holds rains and melted snows, giving it to the soil for the underground supply which feeds springs.

(c) Humus keeps the soil open, summer and winter, permitting it to take moisture rapidly.

(d) Litter and humus act as a mulch preventing rapid evaporation of soil moisture.

(e) Humus keeps the surface soil fertile, which helps to make good tree growth.

(f) Humus protects the surface soil from erosion.

(g) Humus is said to prevent the complete development of many injurious insects.

Changing humus to ashes eliminates all of the above benefits. Floods, erosion, irregularity and impurity of water supply both for home supply and for power, and all the calamities attendant upon these conditions are the results. The loss cannot be estimated in dollars.

The opening of the forests and the removal of humus by fire bring about conditions which make it easier for fires to rage. Each successive fire makes conditions more favorable for the next, until in time everything of value is destroyed and desolation results.

Fires destroy game and fish. Spring fires, especially, are fatal to young animals of all kinds, and many bird eggs are destroyed. Not infrequently both in spring and fall the water of some of the small streams has been heated sufficiently to kill fish. By destroying the factor which largely regulates the steady flow of streams and by making the banks of the streams bare of their natural protection, fish life is seriously affected.

Fires cause a decrease of bird life. Bird eggs and young birds are destroyed directly. By reason of frequent disturbance birds are driven away from a region of forest fires. By the destruction of the forest and the making of desolate hills, conditions favorable to bird life are destroyed and birds become scarce.

Scarcity of birds adversely influences agriculture.

Fires destroy the beauty of a region. The beauty of certain regions is responsible for bringing to them millions of dollars each year. Green forests covering the mountains and keeping the streams steady and clear are the most important factors in the maintenance of this asset. Fires promote desolation rather than life and beauty. A fire swept region is anything but beautiful.

Forest fires are calamities. They destroy great values without the least compensating benefit, and the trail of loss in wages, industry, taxes, revenue, prosperity, sport, health, comfort, and even life, leads to every home in the land.

The prevention of forest fires is absolutely necessary for the welfare of Pennsylvania. Some fires will occur. They must be discovered quickly. They must be reported quickly. They must be attacked and extinguished quickly. This means that Pennsylvania must have an efficient organization and equipment for the prevention, detection and extinction of forest fires.

The organization is being effected. It must be completed and furnished with necessary equipment.

Observation towers must be erected and equipped.

Telephone lines must be built.

Fire hazards must be eliminated.

Our people must be educated.

You help bear the loss of forest fires. The loss is far greater than the cost of prevention could ever be. Why not save for yourself and the Commonwealth by being careful yourself, by urging others to be careful, by helping to extinguish fires when you see them, and by insisting that the Legislature and Governor provide an adequate sum of from $150,000 to $200,000 for two years for this important preventive and remedial work?

LEGAL AFFAIRS

In accordance with the part of the law directing the Chief Forest Fire Warden "to collect and arrange information concerning violation of laws relating to the protection of forests from fire, and to present the same to the Commissioner of Forestry," soon after fires started in the spring and reports from wardens came in, a number of cases were prepared and presented to the Commissioner of Forestry, who in turn forwarded them to the Attorney General. During the year the following cases were referred to the Attorney General.

Legal Action Ordered and Cases Now Closed

MONROE COUNTY.

November 10, 1915. Reported by forester John L. Strobeck, as having burned over 5 acres of private lands. Frank Lape, Joe Lape, Rollin George, and Dr. F. P. Summa, of Nanticoke, smoked out a coon on land belonging to George Wagner of Pocono Lake. In December, the Monroe County court imposed a fine of $10.00 and costs upon the four hunters who plead guilty. $25.00 damages paid to owner of land.

McKEAN COUNTY.

May 11, 1916. Keating township. Reported by forester R. Lynn Emerick as having burned over 12 acres of private land, with total loss of $25.

Reported as having been started from sparks from a clearing set on fire by Sam Oliver. Case tried in September court, McKean county, and defendant settled by paying costs of suit, and $25 damages to Hyland Bros., owners of land damaged.

No expense to State for extinction.

POTTER COUNTY.

May 11, 1916. Summit township. Reported by warden Albert O. Baker as having burned over 10 acres of State and 40 acres of private land, causing a loss of $50.

Caused by Wm. Smith setting fire to logs and brush in clearing. Suit instituted and defendant plead guilty. Sentence was suspended upon payment of the costs of prosecution, and a reprimand in open court.

Cost of extinction to State $21.85.

LACKAWANNA COUNTY.

May 2, 1916. C. H. Eschenbach refused to aid forest fire warden Chas. Hessler. Mr. Hessler was instructed to bring suit. Defendant had a hearing before Walter Seroko, Justice of the Peace, and produced papers from two physicians. Dr. Kerling, of Gouldsboro and Dr. Ahlbouse, of Wilkes-Barre, to the effect that he was unable to travel through the woods to fight fire, on account of rheumatism. The justice dismissed the case. Notwithstanding the statements of the physicians, the defendant is a carpenter and at the time of the fire was doing scaffolding and roof carpentering work.

Legal Action Ordered and Now Pending

BLAIR COUNTY.

April 18, 1916. Frankstown township. Reported by warden H. E. Chamberlin as having burned over 400 acres of private land and doing $550 damage. Cause of fire given as "sparks from McKelvey Bros. engine."

Cost of extinction, $2.50.

Prosecution ordered in connection with fires of 1915. Still in hands of district attorney.

Later fires caused by same company:

May 14, 1916. 20 acres. Cost of extinction $3.25 Damage, $25.00.
December 7, 1916. 25 acres. Cost of extinction $3.57. Damage, $100.00.

April 18, 1916. Woodbury township. Reported by warden R. R. Maloney as having burned over 1000 acres of private land and doing $2000 damage. Cause of fire given as "spark from stave mill of Frank Beers. Spark blew in old tree and tree burned down, then woods were fired from it."

Prosecution to be ordered if investigation warrants.

FAYETTE COUNTY.

May 11, 1916. Henry Clay township. Reported by warden Joseph H. Humberston as having burned over 500 acres of private land, and causing damage of about $650.

Cause of fire given as "burning brush on land of John Holt."

Cost of extinction, $21.05.

Prosecution recommended.

FRANKLIN COUNTY.

November 12, 1916. Reported by forest ranger John Bricker. Ranger Bricker saw Herman McFerren light a match and fire the leaves.

Prosecution ordered November 14, and warrant issued immediately.

This same young man was before the court last year upon the same charge and was acquitted largely on account of sympathy.

FULTON COUNTY.

April 30, 1916. Brush Creek township. Reported by forester A. E. Rupp as having burned over 150 acres of private land, causing a total damage of $300. Cause of fire given as incendiary. "Three persons, viz., Scott Wible, Wm. Hampton, and John Hampton were seen by Archie Fredric, of Wells Tannery, coming from the fire immediately after it started."

Cost of extinction, $15.46.

Investigation recommended.

LACKAWANNA COUNTY.

May 4, 1916. S. P. Wentzel, Ralph Wentzel, and Christ Brady, of Thornhurst, refused to aid forest ranger W. L. Kauffman to fight forest fire. Prosecution ordered.

S. P. Wentzel waived a hearing and gave $300 bail for appearance at court. Ralph Wentzel's case was dropped on account of his age, being only 16 years old. Brady was held in $300 bail for court. Brady's case was ignored by the grand jury, and S. P. Wentzel was acquitted.

Further prosecution ordered.

LEHIGH COUNTY.

April 19, 1916. Lynn township. Reported by warden George H. Rabert as having burned over 15 acres of private land, causing a loss of about $100.

Origin of fire unknown, but suspicion directed against party living in the neighborhood as incendiary.

Cost of extinction, $5.58.

Investigation recommended.

LUZERNE COUNTY.

May 11-12, 1916. Fairview township. Reported by wardens Richard I. Conety and A. F. Bond, as having burned over an area of from 7 to 8 miles square.

Reported as having been caused by spark from Lehigh Valley Railroad engine.

Cost of extinction, $240.05. Prosecution ordered.

LYCOMING COUNTY.

December 8, 1916. Lewis Venemens refused to aid warden Silas Hostrander to extinguish forest fire.

Referred to Attorney General December 20, 1916.

Prosecution ordered.

POTTER COUNTY.

April 16, 1916. Eulalia township. Reported by forester R. Lynn Emerick as having burned over 30 acres of private land, causing damage amounting to $15.

Caused by sparks from burning pasture field by Frank McNamara.

Cost of extinction to State, $8.80.

Prosecution ordered. Warrant issued awaiting return of McNamara.

WESTMORELAND COUNTY.

April 20, 1916. Unity township. Reported by warden R. N. Johnston as having burned over 25 acres of private land, causing a damage of $250.

Reported as being caused by saw mill belonging to Harry Roadman who did not try to extinguish it.

Cost of extinction to State, $8.01. Prosecution ordered.

May 11, 1916. Series of six fires. Ligonier township. Reported by warden John W. Darr as having burned over 125 acres of private land, causing damage amounting to $253. Fire started by unknown person or persons.

Cost to State for extinction, 4 fires, 60.51; 2 fires, no expense.

Investigation by State Police.

Nov. 5-6, 1914. Blair Lumber Company. Claim for damages to State land.

Legal Action Refused

LYCOMING COUNTY.

April 19-26, 1915. Reported by forester H. C. Evans as having burned over 300 acres of State Forest and 3,000 acres of private land. The cause of the fire is given as "Marion Campbell burning rubbish in a field belonging to his father, in a careless manner." A strong wind was blowing and fire spread quickly to adjoining property.

Refused on ground of length of time elapsed since fire and belief in inability to obtain conviction.

Bill for extinction paid by State amounted to $404.31.

Time of forestry officials amounts to an additional sum of $56.70.

BEDFORD COUNTY.

April 16, 1916. West Providence township. Reported by warden R. W. Weicht as having burned over 3½ acres of private land, and doing probably $10 damage. The cause of the fire was given as "set by two boys, George Price, son of Mrs. Emma L. Price, and Frank Shaup, son of Jacob Shaup, of Everett, R. F. D. No. 7.

Bill for extinction $3.55.

Mrs. Price and Mr. Shaup both written to and cost of extinction was paid by Mr. Shaup. Check endorsed to State Treasurer.

April 17, 1916. Monroe township. Reported by warden Erastus Diehl as having burned 7 acres of private land. Cause of fire given as "burning a new ground by Conda Wilson, Steckman, Pa."

Bill for extinction paid by the State, $6.33.

Mr. Wilson admits setting the fire. A sudden gust of wind carried sparks into woodland. Mr. Wilson helped to extinguish the fire

Mr. Wilson has been asked to reimburse the Commonwealth for cost of extinction.

April 18, 1916. West Providence township. Reported by warden R. W. Weicht as having burned over 15 acres and doing damage to extent of $53.00. Cause of fire is given as "set by sawmill engine belonging to Blain and Marshal Foor, Everett R. F. D. No. 5."

Bill for extinction paid by the State, $2.65.

Messrs. Foor have been asked to reimburse the Commonwealth.

April 18, 1916. East Saint Clair township. Reported by warden D. W. Stambaugh as having burned 3 acres of private land and doing about $30 worth of damage. Cause of fire is given as "sparks from sawmill of Ross Crissman, Saint Clairsville, Pa."

Bill for extinction paid by the State, $2.07.

Mr. Crissman admits that the fire came from his engine but that it was his first fire in twelve years and he does not expect to reimburse the Commonwealth. He was hired to do sawing for Mr. Isaac Campbell whose land was burned over.

Mr. Crissman and Mr. Campbell have been asked to reimburse the Commonwealth.

May 12, 1916. West Providence township. Reported by warden R. W. Weicht having burned over about 75 acres of private land and doing probably $150 damage. Cause of fire was given as "Broke out from burning new ground by Charles Stayer, Everett, R. F. D. No. 3."

Bill for extinction paid by the State, $25.47.

Mr. Stayer was asked to reimburse the Commonwealth for the cost of extinction, which he has done.

BERKS COUNTY.

April 15, 1916. Hereford township. Reported by warden Adam L. Mensch as having burned over 6 acres of private land and doing $12 damage. Cause of fire given as "burning a brush pile on Gery's property."

Cost of extinction, $2.11.

Mr. Gery was asked to pay for extinction but later excused because fire did not endanger forest property.

BLAIR COUNTY.

May 1, 1916. Logan township. Reported by warden R. L. Goetz as having burned over 450 acres of private land and doing $2,250 damage. Cause of fire was given as "burning brush on adjoining land of E. M. Wilson. Mr. Wilson admits that brush fire got beyond his control."

Cost of extinction, $17.20.

Mr. Wilson was asked to pay cost of extinction, which he did, and check was endorsed to the warden.

May 6, 1916. Frankstown township. Reported by warden W. F. Hyle as having burned 100 acres of private land. Cause of fire given as "J. L. Hartman's dinkey engine." The land burned over belongs to Mr. Hartman.

Bill for extinction paid by the State, $7.30.

Mr. Hartman has been requested to reimbursed the Commonwealth for extinction.

FAYETTE COUNTY.

April 20, 1016. North Union Township. Reported by warden John C. Beatty as having burned over about ½ acre of private land. Damage slight. Supposed that fire was accidentally started by John Churly and Mike Churly of Lemont Furnace. Legal action refused. Suspected parties written to and cautioned.

No expense to State for extinction.

FULTON COUNTY.

April 18, 1916. Bethel township. Reported by forester A. E. Rupp for warden Andrew Bishop, as having burned over 6 acres of private land, and doing about $20.00 damage. Cause of fire given as "sparks from a traction engine burning wood. The engine is owned and operated by Frank Schetrompf, Warfordsburg, Pa. He has engine equipped with two spark arresters, is careful, and helped to extinguish the fire."

Bill for extinction paid by the State, $4.86.

Mr. Schetrompf has been asked to reimburse the Commonwealth for cost of extinction.

HUNTINGDON COUNTY.

May 12, 1916. Todd township. Reported by Warden Amon Saylor as having burned over ½ acre of private land. Report states "'Mrs. James McNeal will swear she saw the Juniata & Southern engine start it."

Referred to the Attorney General. Advised to hold for the present.

Cost of extinction paid by State, $3.42.

LYCOMING COUNTY.

May 9, 1916. Franklin township. Reported by warden J. D. Lunger as having burned over 12 acres of private land and doing about $50 worth of damage. Cause of fire is given as "supposed to have been set by the young son of Margaret and Samuel Poust, Opp, R. F. D., Pa., with intent to burn adjoining land. The boy was seen by two persons to leave the woods a short time before the fire was discovered and his family made no effort to fight the fire, and threatened to prosecute for trespass those who helped:" The land burned over belonged to Margaret Poust.

Cost of extinction, $15.70.

Mr. Poust has been requested to reimburse the Commonwealth.

May 10, 1916. Cummings township. Reported by forester H. C. Evans as having burned over 200 acres of private land. Origin of fire is given as spark from N. Y. C. Railroad engine.

Cost of extinction to State, $6.55.

POTTER COUNTY.

May 11-12. Abbott township. Reported by forester H. C. Van Horn as having burned over 160 acres of State Forest and 20 acres of private land. The damage amounts to about $450.00. Cause of fire given as "spark from burning stump in plowed field of Louis Gnau, Crossfork, R. F. D. No. 1." Bill for fire extinction paid by State, $73.00. This amount does not include a charge of $6.60 for forester's time.

Mr. Gnau has been asked to reimburse the Commonwealth for bill for extinction, $73.00.

TIOGA COUNTY.

May 1, 1916. Shippen township. Reported by warden O. E. Peters as having burned over 990 acres of State and 110 acres of private land. Cause of fire given as "Chester Decker (aged 15 years) burning a brush pile."

Cost of extinction to State, $21.73.

Mr. Decker has been asked to reimburse the Commonwealth for bill of extinction and has promised to do so.

May 11, 1916. Shippen township. Reported by warden O. E. Peters as having burned over 100 acres of State land and 1 acre of private land, causing damage of about $25.

Fire started along N. Y. C. Railroad, supposedly caused by trains shifting in vicinity.

Cost of extinction, $8.37.

The greater number of cases presented to the Attorney General were ruled out on the ground that no suit should be started where it was thought by him that a conviction was uncertain. On the other hand, the attitude of the Department of Forestry is that if a law of the Commonwealth is violated, it is the duty of those entrusted with the enforcement of the law to see that some action be taken, and that as soon as possible after the violation. The people of the State so long have violated with impunity the rights of their neighbors and the Commonwealth itself with their carelessness and indifference to forest fires that it is absolutely necessary to bring about a change in attitude.

Our desire is not to prosecute or persecute indiscriminately with heavy penalties for in many cases no criminality exists. We also realize that "exact justice is usually injustice." In short, we simply want it to be understood commonly that when a fire is started, it must be controlled so as to do no damage to innocent parties, and that if it does do damage, a penalty will be meted out swiftly. The intention of our law is to hold every one responsible for loss occasioned by fire started by himself, or by his operations; and whether he be a natural individual, or an artificial person created by law. It is the duty of the State to fix responsibility for the fire, then individuals who have suffered have a chance to present claims for their losses. Even though a conviction may not be obtained, every fair case means additional education upon the subject of forest fires and their dangers. The officers of the State are given credit for performing their duties, a feeling which is none too common, and the results will justify the expense.

In May, 1913, Veris Burkholder and C. E. Kreighbaum admitted responsibility for a camp fire upon State lands in Lycoming county. Mr. Kreighbaum left home before a warrant could be served upon him. Mr. Burkholder paid a fine and costs amounting to $44.90. In April, 1916, Mr. Kreighbaum returned and voluntarily offered to pay whatever penalty should be placed upon him. He was ordered to reimburse Mr. Burkholder for half the amount paid by him. The case, therefore, is now closed satisfactorily to all parties.

On December 7, 1916, a fire was reported between Tombs and Ramsey stations, Lycoming county, which was extinguished after burning about 15 acres of private property. From information gathered in this section, everything pointed to a Mr. Frank Holden as the party guilty of setting this fire.

On December 8th, this same party left Waterville for his home at Lucullus, setting on the way 25 separate fires, burning approximately 3,000 acres of State and private lands before they could be extinguished.

Forester Robert R. Neefe caused the man's arrest and he confessed to setting one fire on December 7th and all the fires on December 8th. He had him placed in the county jail at Williamsport, and on December 9th had a preliminary hearing before alderman Geo. W. Rianhard of Williamsport. He plead guilty and was placed in jail in default of $500 bail for trial at Quarter Sessions Court in March, or at the pleasure of said court.

Legal action being refused in so many cases, it was decided to take up each case directly with the person responsible for the fire and appeal to his sense of fairness. Each one has been asked to reimburse the Commonwealth for the cost of extinction and to make good the loss suffered by adjoining land owners. The following is a roll of honor:

Bills Paid and Amounts Forwarded to Forest Fire Wardens

County.	Township.	1916.	Cause.	Cost of Extinction.	Paid By.
Bedford,	South Woodbury,	May 1	Burning brush,	$1 55	Andrew Lamborn.
Bedford,	Southampton,	11	Clearing land,	22 69	Fred. Tewell.
Blair,	Logan,	1	Burning brush,	17 20	E. M. Wilson.
Centre,	Rush,	Oct. 7	Dinkey engine,	3 25	Penna. Fire Brick Co.
Juniata,	Beale,	April 19	Burning brush,	55 32	Geo. W. Wilson.
Northumberland,	Snydertown Boro.,	May 12	Burning brush,	6 50	W. F. Kline.
Tioga,	Gaines,	12	Burning brush,	11 35	Casper Eggler.

Bills Paid and Checks Refunded to State Treasurer

County.	Township.	1915.	Cause.	Cost of Extinction.	Paid By.
Lancaster,	West Donegal,	April 14	Burning brush,	$32 35	S. Bailey.
		1916.			
Bedford,	West Providence,	April 16	Boys,	$3 55	Jacob Shaup.
Bedford,	West Providence,	May 12	Clearing land,	25 47	Charles Stayer.
Bedford,	East Providence,	15	Clearing land,	21 20	Samuel Cooper and D. R. Scott.
Blair,	Catharine,	Nov. 2	Road roller,	6 00	County commissioners.
Centre,	Rush,	May 12	Dinkey engine,	5 98	Penna Fire Brick Co.
Centre,	Rush,	12	Dinkey engine,	4 17	Penna Fire Brick Co.
Elk,	Highland,	Oct. 12	Burning brush,	8 85	Gilbert Sinkler.
Fayette,	Bullskin,	May 11	Burning brush,	8 75	Cyrus Stouffer.
Huntingdon,*	Morris,	April 29	Engine,	4 56	Federal Refractories Co.
Huntingdon,	Union,	May 1	Dinkey engine,	14 80	General Refractories Co.
Juniata,	Milford,	Mar. 31	Engine,	2 80	Vincent Lumber Co.
Juniata,	Milford,	31	Engine,	2 60	Vincent Lumber Co.
Lehigh,	Upper Saucon,	May 1	Burning brush,	4 02	H. M. Bachman.
Potter,	Eulalia,	13	R. R. engine,	34 55	C. & P. A. R. R. Co.
Somerset,	Jefferson,	June 1	Burning brush,	2 20	Emanuel Enos.
Tioga,†	Elk,	April 7	R. R. engine,	......	Leetonia R. R. Co.
Warren,	Pittsfield,	Nov. 8	Burning brush,	6 63	A. W. Durlin.
Warren,‡	Southwest,	Aug. 2	Burning brush,	30 50	Haskell Bros.
Warren,	Southwest,	17	R. R. engine,	7 93	N. Y. C. R. R. Co.
Warren,	Southwest,	17	R. R. engine,	1 62	N. Y. C. R. R. Co.
Westmoreland,	Cook,	Dec. 8	Burning brush,	14 50	S. P. Emert.

*$25.00 additional paid by company for damage to State land.
†$10.00 paid by company for damage to State land.
‡A later bill of $4.00 was not presented for payment.

Pending Forest Fire Claims, December 31, 1916

County.	Township.	Date.	Cost of Extinction.	Name.	Cause of Fire.	Remarks.
Adams,	Hamiltonban,	Nov. 20, 1916,	$5 44	John D. Kump,	Boy.	
Bedford,	Monroe,	April 17, 1916,	6 33	Conda Wilson,	Burning brush.	
Bedford,	West Providence,	April 18, 1916,	2 65	Blain Foor,	Sawmill engine.	
Bedford,	East Saint Clair,	April 18, 1916,	2 07	Ross Crissman,	Sawmill engine.	
Bedford,	Bedford,	May 11, 1916,	33 05	Pearl Smith,	Burning brush.	
Bedford,	Woodbury,	Dec. 8, 1916,	20 24	M. E. McNeal,	Logging engine.	
Blair,	Frankstown,	May 6, 1916,	7 30	J. L. Hartman,	Engine.	
Blair,	Logan,	May 12, 1916,	5 15	M. L. Geisinger,	Burning brush.	
Blair,	Greenfield,	Nov. 21, 1916,	3 25	General Refractories Co.,	Engine.	
Blair,	Catharine,	Dec. 7, 1916,	4 15	Tony Falboa,	Burning brush.	
Cambria,	West Taylor,	May 1, 1916,	33 40	Michael Roth,	Burning brush.	
Centre,	Rush,	Oct. 25, 1916,	15 15	Penna. Fire Brick Co.,	Engine,	Damage to State land. $145
Centre,	Rush,	Oct. 28, 1916,	8 10	Penna. Fire Brick Co.,	Engine,	Damage to State land. 20
Clearfield,	Woodward,	May 10, 1916,	49 90	T. G. Alabran,	Drill engine.	
Clinton,	Chapman,	Oct. 4, 1916,	5 85	A. J. Gotschall,	Engine.	
Clinton,	Leidy,	Oct. 12, 1916,	4 41	A. J. Gotschall,	Engine.	
Columbia,	Cunningham,	Nov. 6, 1916,	3 08	Lehigh Valley Coal Co.,	Engine.	
Columbia,	Pine,	Sept. 4, 1916,	2 65	William Derrick,	Burning brush.	
Dauphin,	Wayne,	April 11, 1916,	20 30	Zortman Lumber Co.,	Engine.	
Fayette,	North Union,	April 20, 1916,	24 62	R. M. Fry,	Burning brush.	
Fayette,	Henry Clay,	Oct. 27, 1916,	13 00	Ohiopyle Lumber Co.,	Engine.	
Fayette,	Springfield,	Oct. 28, 1916,	17 35	Indian Creek R. R. Co.,	Engine.	
Fulton,	Bethel,	April 18, 1916,	4 86	F. Schetrompf,	Traction engine.	
Fulton,	Taylor & Wells,	May 13, 1916,	38 50	Wilber Berkstresser,	Burning brush.	
Huntingdon,	Todd, Lincoln and Penn,	April 3, 1916,	67 77	Juniata & Southern R. R. Co.,	Engine,	Damage to State land.
Huntingdon,	Warriors Mark,	May 10, 1916,	7 32	Elmer Wogan,	Sawmill engine.	
Huntingdon,	Todd,	May 12, 1916,	3 42	Juniata & Southern R. R. Co.,	Engine.	
Huntingdon,	Tell,	May 12, 1916,	32 61	Wm. Appleby,	Sawmill engine.	
Huntingdon,	Todd,	Nov. 12, 1916,	3 20	Juniata & Southern R. R. Co.,	Engine.	
Indiana,	East Wheatfield,	May 14, 1916,	63 90	Cramer Quarry Co.,	Ashes.	
Juniata,	Susquehanna,	May 12, 1916,	23 07	David Hoover,	Sawmill engine.	
Lehigh,	Lynn,	Dec. 8, 1916,	20 60	Charles D. Fink,	Burning brush.	
Luzerne,	Conyngham,	April 18, 1916,	32 30	James Dodson,	Sawmill engine.	
Luzerne,	Dennison,	May 10, 1916,	3 05	E. P. Searfoss,	Children.	
Lycoming,	Franklin,	May 9, 1916,	15 70	Samuel Poust,	Boy.	
Lycoming,	Upper Fairfield,	May 13, 1916,	5 11	Chas. Tool,	Burning brush.	
McKean,	Hamilton,	May 11, 1916,	15 73	Gus. A. Carlson,	Burning brush.	

Pending Forest Fire Claims, December 31, 1916—Continued

County.	Township.	Date.	Cost of Extinction.	Name.	Cause of Fire.	Remarks.
Monroe,	Hamilton,	May 9, 1916,	17 05	C. A. Myers,	Sawmill engine.	
Potter,	Pike,	May 10, 1916,	3 38	George Pierce,	Burning logs.	
Potter,	Hector,	May 11, 1916,	21 65	Mrs. Ira McFall,	Burning brush.	
Potter,	Abbott,	May 12, 1916,	73 00	Louis Gnau,	Burning stumps,	Damage to State land.
Potter,	Homer,	May 12, 1916,	12 25	Geo. Glase,	Sawmill engine.	
Potter,	Abbott,	Nov. 3, 1916,	6 09	Frank Yilek,	Burning logs.	
Schuylkill,	Hegins,	April 19, 1916,	65 11	V. Savage,	Sawmill engine.	
Snyder,	Franklin,	May 11, 1916,	11 36	Gelnet & Gemberling,	Sawmill engine.	
Somerset,	Shade,	April 20, 1916,	4 75	M. E. McNeal,	Logging engine.	
Somerset,	Shade,	Dec. 7, 1916,	2 65	M. G. Gindlesperger,	Burning brush.	
Tioga,	Shippen,	May 3, 1916,	21 73	Geo. Decker,	Burning brush,	Damage to State land.
Tioga,	Shippen,	Aug. 19, 1916,	14 95	Henry Smith,	Burning brush.	
Wayne,	Palmyra,	May 15, 1916,	14 05	C. J. Schlager,	Burning brush.	
Westmoreland,	Fairfield,	May 1, 1916,	22 60	Booth & Flynn,	Engine.	
Westmoreland,	Ligonier,	May 13, 1916,	5 78	H. B. Johns Lumber Co.,	Clearing log yard.	

There are also pending the following claims:

Against the Philadelphia & Reading Railroad Company for damage done to State land in Cumberland county as a result of a fire in 1914 and another on May 6 and 7, 1916, $1,075.00.

Against the Pennsylvania Railroad Company for damage done to State land in Elk county as a result of a fire in April, 1915, $494.95.

Against H. K. Van Tuyl, a former fire warden, for misappropriation of money paid him for fire extinction. Amount of claim, $38.97, of which $15.00 has been paid.

Claims for Forest Fire Extinction Withdrawn

County.	Township.	Date.	Cost of Extinction.	Name.	Cause of Fire.	Remarks.
Bedford,	Monroe,	Oct. 31, 1916,	$7 45	T. O. Mearkle,	Traction engine,	Lack of evidence.
Berks,	Hereford,	April 15, 1916,	2 11	Chas. N. Gery,	Burning brush,	Lack of evidence.
Blair,	Huston,	April 18, 1916,	23 95	Chas. W. Reeder,	Sawmill engine,	Lack of evidence.
Cambria,	Jackson,	May 1, 1916,	3 25	Geo. F. Adams,	Sawmill engine,	Lack of evidence.
Cameron,	Emporium Boro.,	April, 7, 1916,	9 90	Mrs. L. D. Robinson,	Burning brush,	Excused on account of poverty.
Carbon,	Mauch Chunk,	April 16, 1916,	41 75	Warren Arner,	Burning brush,	Excused on account of poverty.
Carbon,	Franklin,	Sept. 2, 1916,	8 20	Emerson Strohl,	Burning brush,	Excused on account of poverty.
Centre,	Boggs,	May 1, 1916,	32 32	Chas. Smoyer,	Burning grass,	Excused on account of poverty.
Centre,	Half Moon,	May 11, 1916,	46 92	J. O. Meese,	Burning brush,	Excused on account of poverty.
Centre,	Penn,	Sept. 1, 1916,	6 85	Dan. Kerstetter,	Burning brush,	Lack of evidence.
Clearfield,	Beccaria,	May 10, 1916,	18 00	Alfred Dubler,	Burning brush,	Excused on account of poverty.
Clinton,	Crawford,	April 5, 1916,	7 70	White Deer Lumber Co.,	Engine,	Lack of evidence.
Luzerne,	Dorrance,	April 18, 1916,	3 43	Lyman Searfoss,	Burning auto,	Lack of evidence.
Lycoming,	Gamble,	May 13, 1916,	12 65	Harvey Hessler,	Sawmill engine,	Expense incurred by forester for protection of State land.
Mifflin,	Granville,	April 18, 1916,	43 15	Harry Stover,	Sawmill engine,	Lack of evidence.
Potter,	Sharon,	May 16, 1916,	2 52	James Ward,	Burning brush,	No damage to adjoining property. Warden unnecessary.
Potter,	Summit,	May 11, 1916,	68 85	Bert Reed,	Burning brush,	Lack of evidence.
Schuylkill,	North Union,	May 22, 1916,	7 59	Wm. N. Foos,	Child,	Extreme poverty.
York,	Fawn,	April 18, 1916,	12 38	Walter Stewart,	Sawmill engine,	Warden's services not needed. To be investigated further.

In each case that the party responsible for the fire was excused on account of poverty, it was after responsibility was admitted, investigation made as to claim of poverty, and upon our receipt of a promise to be careful with fire in the future, and to do everything possible to help extinguish future fires in the neighborhood. We feel that in these cases more good has been accomplished than could possibly have been done by legal action.

The following cases are worthy of special notice

CENTRE COUNTY—Snow Shoe Township.

May 12, 1916.—Reported by warden George McCartney as having burned over 12 acres of private land, causing a damage of $5.00.

Caused by dinkey engine of the Lehigh Valley Coal Company, Snow Shoe, Pa. Wardens bill for extinction $1.80, paid by the Lehigh Valley Coal Company before presentation to this office. No expense to the State.

CLINTON COUNTY—Woodward Township.

Reported by warden Ward H. Reeder.

October 10, 1916.	5 acres burned.	Cost of extinction, ...	$2.30
October 11, 1916.	30 acres burned.	Cost of extinction, ...	7.56
October 12, 1916.	80 acres burned.	Cost of extinction, ...	9.24

The above mentioned fires caused by sparks from dinkey engine of the Queens Run Fire Brick Company. Bills for extinction presented to the company by warden Reeder, and paid by them, without expense to the State.

ELK COUNTY—Benezette Township.

October 29, 1916.—Reported by forester Chas. E. Zerby as having burned 2 acres of private land.

Caused by bee hunters smoking out bees. Three young men admitted responsibility for the fire and paid forester's bill for extinction, $3.55, before its presentation to this office. No expense to the State.

FRANKLIN COUNTY—Peters Township.

November 2, 1916.—Reported by forester A. E. Rupp as having burned over 20 acres of private land and causing about $20.00 damage.

Caused by operations of the McLean Construction Company which company at once assumed responsibility and paid bill for extinction, $12.14, before its presentation to this office.

FULTON COUNTY—Ayr Township.

April 18, 1916.—Reported by forester A. E. Rupp as having burned over 12 acres of private land and doing damage to the amount of $30.00.

Caused by sparks from sawmill engine owned by J. W. Mellott, McConnellsburg. Mr. Mellott admitted carelessness and paid the forester's bill for extinction, $21.21, before its presentation to this office. No expense to the State.

LYCOMING COUNTY—Gamble Township.

May 12, 1916.—Reported by warden J. T. Eddy as having burned over ½ acre of private land, causing a loss of $50.

Reported as having been caused by sparks from sawmill owned by Chas. Steiger. Bill for extinction paid by Mr. Steiger to the fire warden before presentation to this office. Cost of extinction $4.15.

NORTHUMBERLAND COUNTY—West Chillisquaqua Township.

April 16, 1916.—Reported by warden Geo. Heddings as having burned over 50 acres of private land.

Fire caused by Bucknell students, supposedly accidental. Bill for extinction, $28.50, paid by those responsible before presentation to this office.

There are numerous instances where no claim for labor was presented either to the party responsible for the fire, or to the State. Undoubtedly there have been many cases where fires have been extinguished and bills paid without coming to the attention of this Bureau. A large number of fires are still unreported.

In several instances parents of children who were thought to have set fires were written to and cautioned. In one instance, a school teacher was asked to caution the boys of the school. In another case, a Scout Master was asked to clear up charges against several boy scouts, which was promptly done. In doubtful cases, the attention of those upon whom suspicion rested was called to the circumstances and they were cautioned.

The following cases are examples

BLAIR COUNTY—Logan Township.

October 8, 1916.—Reported by warden R. L. Goetz as a small fire and no damage being done owing to the fact that truant officer W. W. Orner arrived at scene of fire and extinguished it in its incipiency.

Caused by boys 13 years of age setting fire to leaves. Boys and their parents called before fire warden and truant officer at Boy Scout headquarters and reprimanded.

No expense for extinction.

BUCKS COUNTY—West Rockhill Township.

October 28, 1916.—Reported by warden Wm. W. Plank as having burned over 10 acres of private land.

Caused by hunters smoking game out of a hollow tree. No direct evidence, but suspected parties written to and cautioned.

Cost to State for extinction, $12.00.

CENTRE COUNTY—Haines Township.

May 11, 1916.—Reported by forester A. C. Silvius as having burned over 3500 acres of State land and 50 acres of private land, doing a total damage amounting to $3,000.00.

Caused by careless fisherman smoking. No bill presented, but suspected parties written to and cautioned.

Cost to State for extinction, $795.64.

FAYETTE COUNTY—North Union Township.

April 20, 1916.—Reported by warden John Shanabarger as having burned over 125 acres of private land, causing a damage of about $400.00.

Reported as being caused by E. Victor, Fairchance, burning brush. No bill for extinction presented to Mr. Victor on account of lack of evidence, but he was cautioned in regard to fire.

Cost to State for extinction, $9.85.

FAYETTE COUNTY—North Union Township.

Reported by warden John C. Beatty as having burned over about ½ acre.

Caused by John and Mike Churly who were said to have admitted that the fire was started accidentally. These two men were written to and cautioned.

No expense to the State.

There still remains for investigation a case against two young fellows who set fire on State land in Clinton county in April, 1916.

In Schuylkill county, the authorities took charge of a hermitess living in Cumbola mountain and who frequently built fires in the forests, usually for cooking food. These fires seldom reached large size. The woman was sent to the county lunatic asylum.

In Clearfield county, two cases were brought against the Jamestown, Franklin, and Clearfield Railroad Company. According to news report, because of a legal technicality, a verdict for the defendant was rendered.

Some of the difficulties encountered by our foresters upon or near State Forests may be understood from a report by forester W. H. Horning, covering a fire in Cameron county on May 11-14, 1916.

> This fire started about 10 A. M. on Thursday, May 11. Everything was as dry as tinder, due to a high wind which had been blowing for several days, and on this day the wind had become a fierce gale. The time was ripe for the fire fiends to get in their destructive work. Ranger Wykoff was stationed on a high knob at the head of Bronson Run, and I had a crew of men and boys planting trees in Lushbaugh Run. About 10 A. M. ranger Wykoff observed the first smoke rising from the southern end of the ridge which parallels First Fork Creek for a distance of five miles above Sinnamahoning. Then in rapid succession, one fire after another was set along the whole length of this five mile ridge and about noon some one set one or more fires on the big flat lying between Lick Island and Brooks Runs. Thus in a very short space of time we had a fire ten miles long, with a fierce wind to drive it over an immense area, and only a handful of men to fight it. I saw the fire at 1 o'clock P. M., and immediately hurried out to fight it with a crew of seven men. Before starting to the fire I left instructions for ranger Wykoff to get more men and come out to the fire as soon as he returned from Bronson Run. It seemed almost hopeless to attempt to put out so many miles of fire with such a small crew when the wind was fanning the flames so fiercely, but we fought as much as we could on the northeast side and succeeded in keeping it out of Brooks Run where there is a lot of valuable natural growth and some plantations.
>
> At the Sinnamahoning end of the fire, the Aetna Explosives Company had a crew of forty men fighting to keep the fire from burning over their lands in Grove Run. Forester H. E. Elliott helped to direct the fighting of the Aetna Company's men. At the Northwestern side of the fire, Henry Hill, whom we had employed as extra ranger for the month of May, had a crew of five men fighting. He back-fired across the mountain between Brooks Run and the right hand branch of Lick Island Run across to Grove Run, thus cutting off the fire on the western side. Very little fighting was done along the eastern side of the fire because the wind drove it down to the wagon road and farms along First Fork in very short order and it burned itself out on that side before we had a chance to do any fighting. The last of the fire was finally extinguished on Sunday, May 14, after 6,000 acres of State land and 1,000 acres of private land had been burned over.
>
> A few days after the fire, I went over the burned area to determine as well as possible the amount of damage done. Where the fire burned most fiercely, nearly everything was killed, but there was not much valuable growth on that part of the burnd area. Where the fire backed up against the wind, it burned only the surface leaves and killed only the smaller sprouts up to one-half inch in diameter. Most of the valuable growth is two inches or more in diameter and does not seem to have suffered much from the fire. I think $1.00 per acre, or $7,000.00 for the entire area burned, is a conservative estimate of the damage.
>
> This fire was incendiary, beyond doubt, but we have no evidence to prove the guilt of the persons whom we suspect of setting the fire.

Another fire, occurring on October 2, 1916, is worthy of note. It apears certain that this fire was caused by a bee hunter who may have gotten several dollars' worth of honey for his trouble and carelessness. The fire burned for ten days, breaking out afresh day after day, until over 700 acres had been burned. It cost the State $490.34

to have this fire extinguished, and the loss is reported as $2,650. It is time for our people to understand that a bill of over $3,000.00 is rather high for several pounds of honey. Yet shiftless individuals are shielded in their custom of carelessly smoking out bees.

Another fact worth noting is that, notwithstanding our efforts at publicity among sportsmen, they stand third in rank as to number of fires, fourth in rank as to acreage burned over and damage done, and it cost more to put out their fires than those of any other class. Very few of the fires were caused by fishermen, so hunters have the sole glory, if it be any glory to them to be responsible for such a tremendous loss and handicap to their particular sport.

MEETINGS ATTENDED

January 18. Boston, Annual Meeting American Forestry Association.

January 19. Boston. Annual Meeting Eastern Foresters. Visited lumber operations carried on by State Forester of Massachusetts in connection with gypsy moth work.

January 20-21. Boston. Conference of Collaborators in Fire Protection under the Weeks' Law.

April 14. Harrisburg. Pennsylvania Conservation Association and allied interests in behalf of the Cook Park.

June 27-29. Reading. Summer Meeting of Pennsylvania Forestry Association, and summer meeting of Pennsylvania Foresters.

July 10-11. Oil City. Annual Meeting of United Sportsmen of Pennsylvania.

September 5-7. Conneaut Lake. Annual Meeting of Wild Life League.

October 31. Harrisburg. Governors Conference on Flood Control.

November 29. Harrisburg. Governor's Conference on Water Pollution.

December 11. Philadelphia. Annual Meeting Pennsylvania Forestry Association.

PAPERS AND REPORTS PREPARED

Review of reports of forest fire on Medix Forest as submitted by Pennsylvania Railroad foresters and State Forester Chas. E. Zerby.

Present Forest Fire Organization in Pennsylvania—Weeks' Law Conference.

Larch.—"In the Open" magazine.

Tree Planting along Roadsides.—"In the Open" magazine.

Tulip Tree.—"In the Open" magazine.

Collection of Tree Seeds.—"In the Open" magazine.

Observation of Arbor Day.—"In the Open" magazine.

Department Circular 16.—Forest and Woodlot Tree Planting.

Synopsis of 1915 forest fire data for Department Report.

Protection of the Forests. Pennsylvania Arbor Day Manual.

Influence of Forest upon Stream Flow. Department use.

Report to be referred to committee appointed at Hazleton meeting.

Report on damage done to Pine Grove Forest by forest nre of May 6, 1916.

Report on examination of property of American Zinc & Chemical Co., Langeloth Suggestions for future tree and forest development.

Protection of our Forests. Journal of the Engineers' Society of Pennsylvania.

ADDRESSES

January 6. Altoona. Chamber of Commerce. About 70 in attendance. "What should be the Attitude of the Chamber of Commerce to Forestry in Blair County?"

February 16, 23, March 1, 8, 15, 22, April 5, 12. Ambler. Womens' School of Horticulture. About 25 in attendance at each meeting. Eight lectures on "Care of Farm Woodlot."

February 22. Altoona. Men's Bible Class, Second U. B. Church. About 100 in attendance. "What Forestry Means."

March 24. Lewistown. Sportsmen's Association and Boy Scouts. About 75 in attendance. "Influences of Forests."

March 28. Bedford. Civic Club and Parent-Teachers Association. About 100 in attendance. "Care of Trees."

March 29. Bedford. School children of all grades. "Care and Study of Trees."

April 28. Selinsgrove. Susquehanna University. Arbor Day exercises. About 50 in attendance. "The Meaning of Arbor Day."

May 17. Ambler. Women's School of Horticulture Conference. About 75 in attendance. "Care of Trees."

July 11. Oil City. Annual meeting of United Sportsmen of Pennsylvania. About 40 in attendance. "Forest Protection in Relation to Game and Fish."

August 2. Mont Alto. State Forest Academy students. About 30 in attendance. "Forestry in Pennsylvania."

August 3. Mont Alto. State Forest Academy students. About 30 in attendance. "Protection of Forests from Fire in Pennsylvania."

August 24. Mont Alto. Graduation Exercises State Forest Academy. About 150 in attendance. Greetings to graduating class.

September 5. Conneaut Lake. Annual meeting of Wild Life League. About 150 in attendance. "Protection of Forests from Fire."

September 8. Bradford. Timber owners or lessors. About 15 in attendance "Forest Protection and Organization of Protective Association."

September 16. Altoona. Blair County Sportsmen. About 30 in attendance Forest Protection. Illustrated.

September 28. Hazleton. Timberland owners. About 20 in attendance. "Forest Protection and Organization of Protective Association."

December 11. Philadelphia. Pennsylvania Forestry Association. About 20 in attendance. Work of Bureau of Forest Protection.

MISCELLANEOUS.

March 6. Marked trees to be removed on association and park grounds, Mount Gretna.

March 25. Inspected Town Park at Mifflinburg with Committee of Civic Club.

April 7. Marked trees on Chataugua grounds, Mount Gretna.

June 21. Inspection of white pine at Elizabethtown for Blister rust.

July 28. Inspected white pine at Masonic Home, Elizabethtown, for blister rust.

July 28. Looked over part of Chautauqua grounds, Mount Gretna, for gooseberry plants.

August 2 3. Examined fire tower sites on Mont Alto and Caledonia Forests.

August 5-16. Reorganizing fire warden system in western counties.

August 16-17. Examination of property of American Zinc & Chemical Company, Langeloth, Pa.

September 30. Set up lantern slide exhibit at Scranton.

November 8-9. Examined sites for fire towers on White Deer and Buffalo Forests.

November 20-22. Reorganizing fire warden system in Chester county.

December 21. Reorganizing fire warden system in Bucks county.

FINANCIAL REPORT

Deficiency Appropriation for fires previous to June 1, 1915,			$17,500 00
Expenditures, January 1, 1916,		$15,336 88	
14 bills approved during 1916,		323 60	15,660 48
Balance available January 1, 1917,			$1,839 52
Appropriation, June 1, 1915 to June 1, 1917,			$45,000 00
Expenditures, January 1, 1916,		$4,403 85	
1915 expenses approved and paid during 1916:			
Fire extinction,	$81 63		
Protective association expenses,	16 01		
Foresters' expenses,	23 00	120 64	
1916 expenses approved and paid during 1916:			
Salary, Chief Forest Fire Warden,	$2,499 96		
Salary, clerk,	1,000 00		
Expenses, Chief Forest Fire Warden,	388 11		
Expenses, clerk,	302 41		
Expenses, foresters,	788 59		
Expenses, Local Fire Wardens,	640 14		
Tools,	67 66		
Postage,	575 00		
Gummed stickers (educational),	112 20		
Patrol—direct from fire fund,	1,008 36		
Overdraft on patrol salary (Returned to State Treasurer),	41 60		
Expenses Protective Associations,	842 99		
Fire extinction,	13,080 85	$21,347 87	
Total expenditures,			$25,872 36
Balance available January 1, 1917,			$19,127 64

Detailed Statement of Expenses Incurred in Connection With Extinction of 1916 Fires, Bills for Which Were Approved During 1916.

County.	Labor.	Transportation.	Meals.	Telephone.	Affidavit.	Tools.	Postage.
Adams,	$98 91	....	$2 25	....	$1 05	....	....
Armstrong,	36 60	....	....	....	1 50	....	....
Bedford,	485 24	$4 25	6 95	....	9 50	....	$0 25
Berks,	285 38	11 75	75	40	6 25	....	03
Blair,	514 52	42 75	3 85	....	7 50	....	02
Bradford,	8 75	8 00	....	....	25	....	....
Bucks,	19 30	....	....	....	75	....	....
Butler,	9 60	....	....	....	25	....	....
Cambria,	123 80	4 70	....	....	4 75	1 60	....
Cameron,	149 40	2 15	42 75	....	2 25	....	....
Carbon,	204 86	20 65	2 00	....	4 25	....	....
Centre,	1,305 24	167 81	76 43	50	6 22	....	....
Chester,	50 27	3 00	....	....	75	....	....
Clarion,	12 25	60	....	....	50	....	....
Clearfield,	163 20	4 00	8 25	....	2 50	....	....
Clinton,	494 87	17 50	10 45	20	5 38	1 00	....
Columbia,	174 30	11 00	1 00	....	1 58	....	....
Crawford,	1 50	3 00	....	....	25	....	....
Cumberland,	168 54	4 01	....	....	2 50	....	68
Dauphin,	299 94	3 25	75	....	4 00	....	....
Elk,	437 82	114 80	22 71	....	1 37	....	1 60
Fayette,	297 63	12 70	50	....	4 25	....	1 02
Forest,	21 30	1 50	....	....	50	....	....
Franklin,	405 59	24 75	25 13	....	3 75	*8 50	....
Fulton,	198 31	4 75	2 15	40	1 45	....	....
Huntingdon,	778 20	97 54	26 03	94	5 75	....	....
Indiana,	76 95	2 00	....	....	1 00	....	....
Jefferson,	2 93	....	....	....	25	....	....
Juniata,	186 55	13 25	3 50	21	3 25	....	....
Lackawanna,	220 23	5 80	....	....	2 00	....	....
Lancaster,	57 31	6 00	....	....	60	....	....
Lebanon,	52 85	2 00	....	....	50	....	....
Lehigh,	71 41	1 00	....	....	1 50	1 50	....
Luzerne,	762 60	88 87	....	....	8 75	....	1 00
Lycoming,	383 88	30 15	19 48	....	4 75	....	....
McKean,	57 90	....	....	....	51	....	....
Mifflin,	297 58	11 26	12 90	10	1 82	....	....
Monroe,	120 12	34 95	....	....	3 91	7 65	....
Northumberland,	75 88	1 50	....	....	2 17	....	....
Perry,	124 59	9 25	....	....	3 00	....	....
Pike,	120 55	62 30	1 25	....	2 09	....	....
Potter,	613 35	22 50	3 50	60	5 74	....	....
Schuylkill,	346 44	16 00	....	....	6 50	....	....
Snyder,	224 73	10 44	1 34	....	1 71	....	....
Somerset,	118 13	11 00	....	....	4 00	....	....
Sullivan,	169 20	3 90	2 76	....	4 50	....	....
Susquehanna,	2 70	....	....	....	25	....	....
Tioga,	191 43	6 50	3 43	....	2 25	....	....
Union,	154 08	10 46	7 97	05	1 25	....	....
Warren,	51 28	4 75	....	....	1 50	....	....
Wayne,	98 65	11 00	....	....	1 25	....	....
Westmoreland,	296 85	10 75	4 75	....	5 50	....	....
Wyoming,	67 66	4 00	....	....	1 25	....	....
York,	21 18	....	....	....	50	....	....
	$11,664 43	$944 09	$292 83	$3 40	$151 25	$11 75 *8 50	$4 60

*Medical attention.

Grand total, $13,080.85.

Detailed Statement of 1916 Expenses Incurred by Protective Associations, Submitted and Approved During 1916.

	Printing and stationery.	Postage.	Secretary's allowance.	Travel and telephone charges.	Towers and telephone lines.	Tools.	Patrolmen.	Office rent.	Affidavits.	Paid by association.	Paid by State.
Central Pennsylvania Forest Fire Protective Association,	$66 18	$9 15	....	$20 00	....	$23 33	$112 75	$33 00	$2 00	$133 23	$133 18
McKean County Protective Fire Association,	17 25	11 58	$5 00	....	....	....	....	....	25	17 04	17 04
Pocono Protective Fire Association,	90 80	36 97	63 91	4 55	59 07	37 27	1,090 00	....	2 00	691 80	692 77
	$174 23	$57 70	$68 91	$24 55	$59 07	$60 60	$1,202 75	$33 00	$4 25	$842 07	$842 99

It is not likely that there will be any additional charges against the deficiency appropriation.

The fact that there is still over $19,000.00 available from the current appropriation is due to two things. The spring season was unfavorable for fires, except for several short periods in April and May. Notwithstanding this fact, 506 fires were reported, The fall season was much more favorable to fires, and 507 were reported. Over 100 fires were reported from all over the State as having occurred on the 6th, 7th, and 8th of December. Had there been continuous dry spells in spring as in the spring of 1915, more serious results might have occurred.

There is little difference in the number of fires reported in 1916 and in 1915. Evidently organization, promptness on the part of wardens, and general education, helped to keep down expenses. The total expenses in 1915 were over $30,000.00, while in 1916 they have been close to $20,000.00.

It will be observed that there is a discrepency between the cost of fire extinction as given in the financial statement and the cost of fire extinction as given in Table II. This is due to the fact that the table includes reports of fires, the bills for which were approved subsequent to January 1, 1917, and which will be accounted for in the 1917 financial statement.

FOREST PROTECTION BUDGET—JUNE 1, 1917 TO JUNE 1, 1919.

1.	Salary of Chief Forest Fire Warden, $2,500 per year,		$5,000 00
2.	Salary of clerk, $1,200 per year,		2,400 00
3.	Traveling expenses for Chief Forest Fire Warden and clerk,		1,500 00
4.	Office expenditures,—postage and extra help,		2,000 00
5.	Eight District Fire Wardens:		
	Salaries, $1,500.00 per year,	$24,000 00	
	Expenses,	8,000 00	32,000 00
6.	Expenses ex-officio, special, and local forest fire wardens:		
	Fire prevention, extinction, and performance of other duties,		80,000 00
7.	Observers and patrolmen (salaries and expenses) (80),		16,000 00
8.	Towers, telephone connections, and telephone rentals,		15,000 00
9.	Fire fighting equipment,		5,000 00
10.	Co-operative agreements,		10,000 00
11.	Publicity features,		2,000 00
12.	Investigation, report and eradication of dangerous forest fungi and insects,		15,000 00
	Total,		$185,000 00

Items 1 and 2 need no explanation.

Item 3. Traveling expenses for the Chief Forest Fire Warden will have to be heavy for the next two years if a forest fire prevention system is to be worked out for Pennsylvania. The fire warden organization will have to be looked after more in detail until district fire wardens can be drafted into duty; fire hazards will have to be investigated and ordered to be abated; causes of forest fires will have to be checked and investigated more than ever before; sites for fire towers must be selected carefully; forest mapping must be started, checked, and finished. Needless to state, $60.00 per month for these expenses will hardly be sufficient.

Item 4. It is one thing to choose good men for an organization and another to keep in touch with them. In order to keep the fire wardens awake to their opportunities of service and their duties, it is necessary to send circulars to them from six to eight times per year. From time to time other classes of citizens must be circularized. Forms must be sent out. Inquiries require stamped return envelopes. Ordinary correspondence is becoming heavier as the work proceeds. From $1,000 to $1,500.00 will be needed in the next two years for postage alone.

At times, the office work becomes too heavy for one clerk, and a stenographer whose time is only partly devoted to the work of this Bureau. Other help will have to be available if good work is to be expected.

Item 5. Under present conditions all of the 21 fire districts but nine receive some supervision by reason of our State foresters doing this work in addition to their other duties. The results are not satisfactory and conditions ought to be remedied as soon as possible. However, we believe that if we can obtain enough appropriation to locate eight district fire wardens in the next two years at annual salaries of $1,500.00 each and with annual expenses amounting to $500.00, we can present enough results by that time to prove the value of completing the organization as planned.

The Chief Forester of British Columbia stated the necessity of field supervision very clearly. He says:

> "Because of lack of field supervision, more money is wasted in fire protection today than is used economically. Fire wardens are nearly all temporary men, and if one does not give them supervision and training, and does not try to keep the good man from year to year, one cannot get the results desired. In the first fire protection services of Canada, far more wardens were wasting money than were making good use of it. Unless we have good permanent rangers year after year we will not get the good results because we have large areas to protect with very small sums of money."

Item 6. For the last eight years the average cost for fire extinction alone has been close to $28,000.00. If a serious fire season, or several of them, come upon us, we must be prepared for the emergency, and $60,000.00 is not too much to have available for this purpose.

The fire wardens need to be trained in co operative methods, fire extinction, detection of causes, and other things in connection with their work. They are also expected to do a certain amount of publicity work which should not be done entirely upon their own time. Meetings of fire wardens are an important factor in the efficiency of our system and must be held more or less regularly. $20,000.00 for two years is a small figure to cover these expenses.

Item 7. Prevention is better than extinction. Patrolmen are a part of the prevention system being worked out. So also are fire towers and observers for duty thereon. The employment of anything less than 100 such men in this great Commonwealth, with over seven and one-half millions of acres of forest land to protect seems ridiculous, and yet $16,000.00 for two years will permit us to employ only 80 such men at a monthly salary of $50.00 and an average term of employment of two months per year. The work of these men will return to the Commonwealth many times the value necessary to employ them.

Item 8. With the forest land situated as it is, there will be necessary probably 150 primary towers from which to observe fires promptly in order to protect properly the interests at stake. These towers will be of advantage to many people for many purposes. They will average in cost from $200 to $300. Many of them will be built by joint subscriptions from the State and from local people. We have figured that with the amount listed we can build about 40 such towers and connect them with some telephone system so that information of the origin of a fire may be quickly announced to the wardens, and consequently quickly extinguished.

Item 9. No fire warden or crew of men can do quick and efficient work at fire extinction without tools, any more than a city fire department can do its work without equipment. We have been expecting our men to furnish their own tools with the result that fire extinction always costs considerably more than it should, and damages are consequently increased. $5,000.00 will not permit of an average expenditure of $4.00 for each forest fire warden. It will hardly be sufficient to furnish each warden with two torches and two axes.

Item 10. There are now three protective associations with which we are co-operating, and all three are growing because of the good work they are doing. As they increase in membership, they increase their expenditures and we must meet their amounts. Other organizations will be formed within the next two years and $10,000.00 is not likely to be sufficient to meet the needs of these agreements.

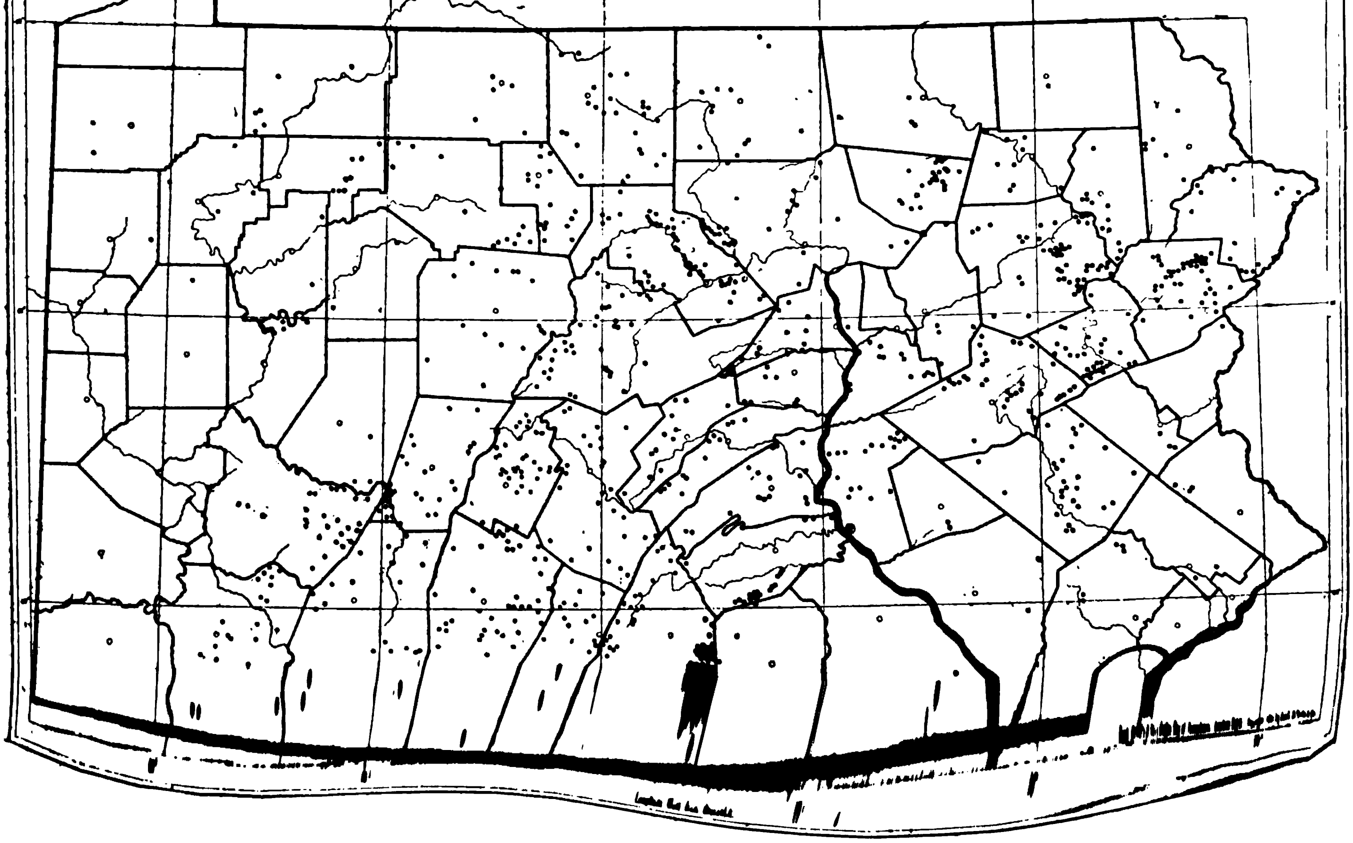
Item 11. Every cause must be kept before the people in all sorts of ways and in all sorts of places. Business firms do not have to be told that it pays to advertise, neither do people who know the forest problem. There must be educational and publicity methods used by our Department for years to come until fire prevention becomes second nature. Simple printing does not answer all needs so a fund must be available for the purchase of other features, or for the carrying out of other methods of publicity. $1,000.00 a year for this purpose will yield many times its face value in good results.

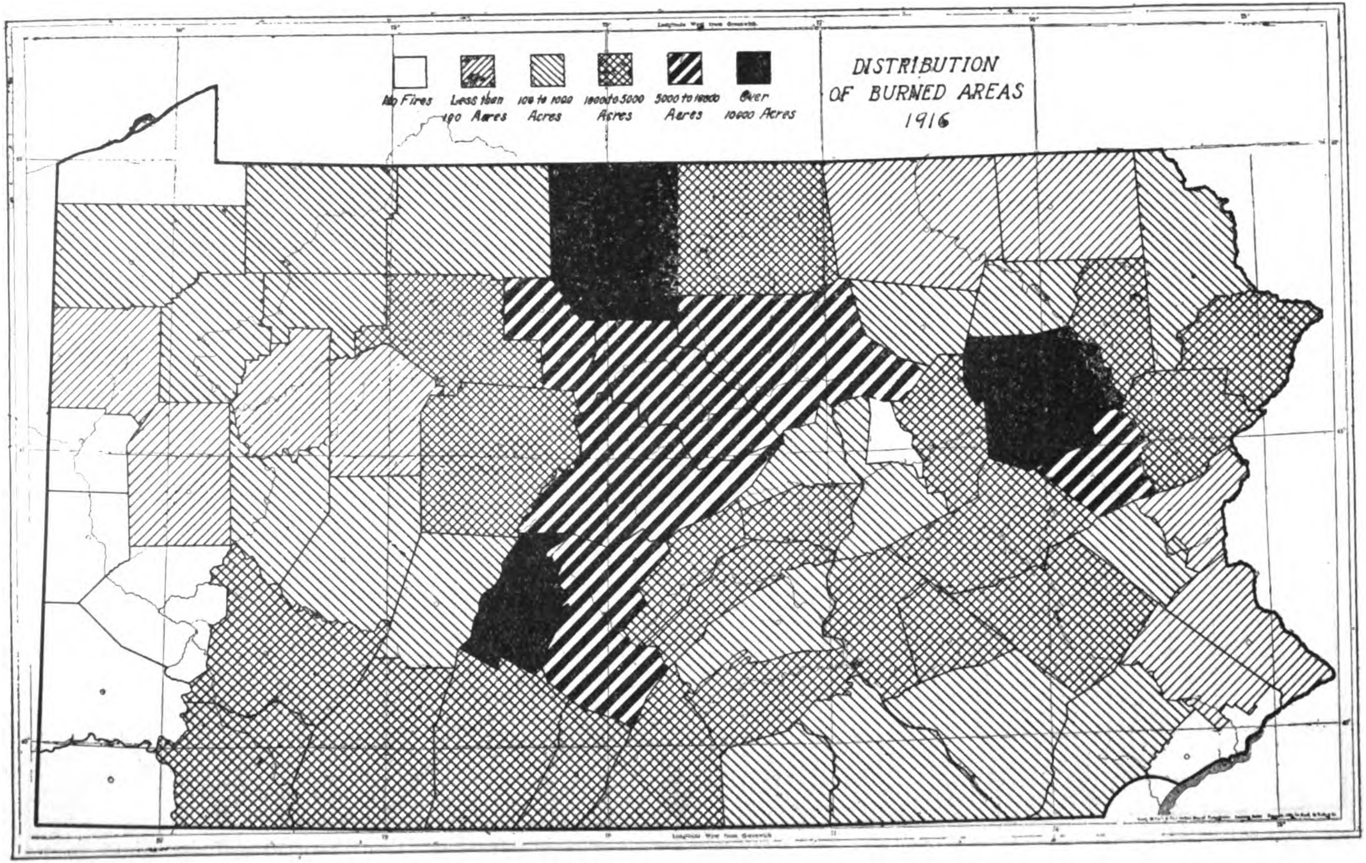
Item 12. We have faced and suffered a tremendous loss through the chestnut blight disease because it was not detected and checked when it might have been possible to save much of the loss. We are now face to face with another fungus disease. This time it attacks the white pine. Unless carefully kept under control, it will wipe out our white pine. Insect troubles are also on the increase and there must be an attack made against these forces. $15,000.00 is not sufficient for this work, but will at least start it and get things in shape for some kind of success in the near future.

TABLE I. *Detailed Statement of Forest Fires in 1916.*

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		ADAMS COUNTY.						
April	18	Hamiltonban,	30	$160	Burning building,	$10 63	$6 16	Staley.
	20	Franklin,	25	28	Incendiary,	5 35	....	Hall.
May	5	Menallen,	.5	2	Incendiary,	4 22	....	Williams.
	6	Menallen,	60	600	Incendiary,	18 93	....	Williams.
	19	Menallen,	.5	4	Incendiary,	1 98	....	Williams.
	20–21	Menallen,	82	100	Incendiary,	12 68	....	Williams.
	21	Menallen,	313	650	Incendiary,	46 67	25 24	Williams.
Oct.	30	Menallen,	10	10	Incendiary,	1 75	11 98	Conklin.
Nov.	20	Hamiltonban,	5	52	Children (*),	5 44	....	Strausbaugh.
			526	$1,606		$107 65	$13 38	
		ARMSTRONG COUNTY.						
May	1	Madison,	50	$150	P. R. R. (?),	$5 96	....	Paine.
	21	Madison,	55	100	P. R. R. (?),	5 83	....	Paine.
	21	Madison,	15	25	P. R. R. (?),	1 02	....	Paine.
Oct.	15	Mahoning,	.2	5	Unknown,	....	$1 65	Shoemaker.
	26	Mahoning,	4	17	Unknown,	8 95	....	Shoemaker.
	28	Madison,	20	100	P. R. R. (?),	1 75	10 00	Lozenz.
	29	Madison,	30	175	Hunters,	5 83	....	Paine.
	29	Madison,	3	20	Hunters,	2 07	....	Paine.
Nov.	21	Madison,	20	200	P. R. R. (?),	4 83	3 60	Lozenz.
	21	Madison,	25	125	P. R. R.,	2 37	9 60	Lorenz.
			222.2	$917		$38 10	$24 85	
		BEDFORD COUNTY.						
April	1	Londonderry,	150	....	Unknown,	$4 15	....	Mays.
	16	West Providence,	3.5	$10	Boys (a),	3 55	....	Welcht.
	16–17	Colerain-Monroe,	125	100	Unknown,	7 30	$8 60	Byers.
	17	Monroe,	7	....	Burning brush (b),	6 33	....	Diehl.
	18	Bedford,	....	....	Unknown (c),	....	12 00	Barley.
	18	West Providence,	15	53	Sawmill (d),	2 65	....	Welcht.
	18	East St. Clair,	3	30	Sawmill (e),	2 07	....	Stambaugh.

FOREST FIRES REPORTED IN 1916




DISTRIBUTION
OF BURNED AREAS
1916
No Fires
Less than 100 Acres
100 to 1000 Acres
1000 to 5000 Acres
5000 to 10000 Acres
Over 10000 Acres
Longitude West from Greenwich

May	1	South Woodbury,	3	....	Burning brush (f),	....	1 55	Mauk.
	2	East Providence,	150	....	Unknown,	5 50	....	Ritchey.
	8	Broad Top,	3	8	H. & B. T. (?),	5 50	....	Tenley.
	10	Colerain-Monroe,	70	100	Unknown,	22 50	4 80	Byers.
	11	Bloomfield,	10	150	Unknown,	6 40	....	Snyder.
	11-12	Southampton,	200	500	Burning brush (g),	....	21 69	Diehl.
	11-13	Bedford,	500	1,100	Burning brush (h),	33 05	....	Heming.
	12	West Providence,	75	150	Burning brush (i),	25 47	....	Weicht-Byers.
	15	East Providence,	125	85	Burning brush (j),	21 20	4 80	Simpson-Hixson.
June	1	Woodbury,	50	....	Unknown,	7 35	....	Brumbaugh.
	2	Hopewell,	75	500	Unknown,	6 55	....	Smith.
Oct.	17	Woodbury,	2	20	Campers,	....	1 03	Brumbaugh.
	19	South Woodbury,	2	....	Incendiary,	....	1 50	Brumbaugh.
	29-4	Londonderry,	600	....	Unknown,	23 95	....	Mays.
	30-3	Southampton,	50	....	Unknown,	22 15	....	James.
	31-1	Monroe,	2.5	2	Traction engine (?),	7 45	....	Barkman.
Nov.	2-3	Liberty,	290	....	Hunters,	18 85	1 50	Workman.
	2-3	East Providence,	60	100	Hunters,	13 23	3 00	Simpson.
	2-3	West Providence,	54	160	Hunters,	17 04	3 00	Simpson.
	2	West Providence,	1	20	Smoker,	2 93	2 10	Simpson.
	3	West Providence,	40	70	Unknown,	7 30	2 70	Weicht.
	4	Broad Top,	14	100	Unknown,	7 15	....	Tenley.
	9	Monroe,	50	25	Unknown,	5 95	....	Diehl.
	9	Bloomfield,	100	310	Unknown,	17 05	....	Snyder.
	11	King,	25	....	Unknown,	2 35	....	Ickes.
	11-12	Broad Top, East Providence,	400	100	Unknown,	28 08	....	Ford.
	15-16	Colerain,	200	100	Unknown,	3 42	....	Howser.
	17	Liberty,	2	....	H. & B. T.,	2 50	....	Workman.
	17-18	Colerain-Bedford,	50	40	Hunters,	13 75	....	Howser.
	18	Bedford,	200	100	Unknown,	5 50	....	Heming.
	19	Londonderry,	100	....	Unknown,	5 05	30	Mays.
	19-20	Londonderry,	300	....	Unknown,	19 22	....	Mays.
	21	Woodbury,	40	....	Hunters,	11 90	....	Brumbaugh.
	27	Bedford,	40	100	Unknown,	4 45	....	Agnew.
Dec.	5	Bloomfield,	80	300	Unknown,	7 45	....	Snyder.
	5-6	Londonderry,	75	135	P. R. R.,	6 03	90	Byers.
	6-7	Southampton,	350	175	Hunters,	46 80	75	Byers.
	7	Juniata,	4	....	Unknown,	7 75	....	McKinney.
	7-8	Woodbury,	400	....	Logging engine (k),	20 24	....	Brumbaugh
			4,996	$4,703		$483 16	$79 72	

Note (*)—Settlement demanded of parents.
Note (a)—Attorney General refused to act. Warden's bill of $3.55 paid by parents of boys.
Note (b)—Attorney General refused to act. Settlement demanded of person responsible.
Note (c)—Bill outlawed because not presented within sixty day limit.
Note (d)—Attorney General refused to act. Settlement demanded of owners of mill.
Note (e)—Attorney General refused to act. Settlement demanded of owner of mill.
Note (f)—Warden's bill of $1.55 paid by person responsible.
Note (g)—Warden's bill of $22.69 paid by person responsible.
Note (h)—Settlement demanded of person responsible but not yet finally adjusted.
Note (i)—Attorney General refused to act. Person responsible paid warden's bill of $25.47.
Note (j)—Warden's bill of $21.20 paid by person responsible.
Note (k)—Settlement demanded of owner of engine but not yet adjusted.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
	BERKS COUNTY.						
Jan. 28	Cumru,	15	$5	Unknown,	$3 36	$3 55	McNeal.
28	Muhlenberg,	25	50	Unknown,	1 60	....	Fisher.
April 7	Alsace,	.?	....	Smoker (?)	....	....	McNeal.
7	Maidencreek,	6	....	Unknown,	2 52	....	Roberts.
15	Hereford,	6	12	Burning brush,	2 11	....	Mensch.
18	Ruscombmanor,	30	872	Unknown,	16 24	....	Noll.
18	Maidencreek,	30	....	Railroad (?),	5 38	....	Roberts.
18	Greenwich,	4	40	P. & R. (?),	5 30	....	Hein.
18-19	Tilden,	700	2,000	P. R. R. (?),	68 29	....	Bailey.
May 9	Muhlenberg,	6	12	Unknown,	2 81	....	Fisher.
9	Heidelberg,	19	5	Unknown,	15 68	....	Petticofer.
9-13	Albany-Windsor,	800	1,000	Unknown (*),	138 90	4 65	Snyder-Martin-Schlegel.
11	Albany,	4	40	P. & R.,	4 10	....	Altenderfer.
12	Lower Alsace,	2	2	Unknown,	70	1 00	McNeal.
12	Ontelaunee,	200	1,000	P. & R. (?),	8 65	....	Fisher.
12	Albany,	2	15	Unknown,	1 39	83	Altenderfer.
12	Longswamp,	10	100	P. & R.,	3 27	....	Mensch.
13	Greenwich,	2	....	Unknown,	9 26	1 80	Altenderfer.
21	Exeter,	.2	....	Smoker (?),	....	....	Logan.
Oct. 26	Muhlenberg,	5	3	Unknown,	62	1 80	McNeal.
Nov. 2	Robeson,	8	....	P. & R. (?),	1 75	....	Evans.
2	Robeson,	5	15	P. & R. (?),	85	....	Evans.
3	Earl,	4	46	Unknown,	3 70	45	Guldin.
19	Robeson,	2	5	P. & R. (?),	1 45	....	Evans.
29-30	Bethel,	300	300	Hunters,	8 15	....	Ebling.
Dec. 6-7	Muhlenberg,	40	90	Railroad,	4 52	....	Fisher.
8	Earl,	.2	10	Unknown,	1 15	....	Mest.
		2,225.4	$5,112		$305 71	$14 08	
	BLAIR COUNTY.						
April 16	Logan,	30	$45	P. R. R.,	$2 42	....	Chamberlin.
18-19	Frankstown,	400	550	Lumbering (a),	2 50	....	Chamberlin.
18-19	Huston,	500	....	Stave mill (?),	23 95	....	Hyle.
18-19	Woodbury,	1,000	2,000	Stave mill (b),	31 85	....	Maloney.
30	Antis,	25	....	Boys (?),	4 70	....	Keller.

May	1	Logan,	450	2,250	Burning brush (c),	....	$17 20	Goetz.
	6	Frankstown,	100	....	Lumbering (d),	7 30	12 45	Hyle.
	9-14	Logan-Frankstown,	11,000	11,000	Incendiary (?),	191 00	6 60	Chamberlin.
	11	Logan,	100	520	Unknown,	10 45	....	Yost.
	11	Antis,	300	....	P. R. R.,	7 93	....	Keller.
	12	Logan,	20	....	Unknown,	4 90	....	Goetz.
	12	Logan,	1	....	Burning brush (e),	5 15	80	Taneyhill.
	13	Antis,	40	....	Unknown,	7 22	....	Keller.
	14-15	Frankstown,	20	25	Railroad (?),	3 25	....	Hyle.
Oct.	7	Logan,	4	....	Burning brush (?),	5 50	45	Goetz.
	8	Logan,	?	....	Boys (f),	....	....	Goetz.
	9	Juniata,	50	....	Unknown,	2 50	....	Ritchey.
	15	North Woodbury,	4	....	Hunters,	....	1 20	Brumbaugh.
	18	Antis,	5	....	Unknown,	3 35	....	Keller.
	18-19	Logan,	40	....	Hunters,	13 65	....	Goetz.
	26-27	Frankstown,	100	50	Unknown,	21 13	....	Goetz.
	26-27	Frankstown,	75	100	Unknown,	6 70	....	Garner.
	26-27	Tyrone,	200	150	Hunters (?),	12 55	....	Fleck.
	28-30	Tyrone,	600	....	Hunters,	33 55	....	Miller.
	29-30	Logan,	70	35	Unknown,	14 32	....	Goetz.
	29-30	Tyrone,	600	600	Unknown,	29 95	....	Fleck.
Nov.	2	Catharine,	150	600	Road roller (g),	11 25	48 00	Hyle.
	9	Logan,	20	25	P. R. R.,	....	....	Goetz.
	11	Antis,	50	....	Unknown,	6 50	....	Keller.
	11	Frankstown,	1	5	Hunters,	1 80	....	Gold.
	19-22	Huston,	1,000	250	Unknown,	63 40	....	Acker-Brumbaugh.
	21-22	Greenfield,	40	75	Mining engine (h),	3 25	....	Lingenfelter.
Dec.	2	Logan,	15	65	Burning building (i),	4 15	....	Goetz.
	6	Frankstown-Catharine,	50	50	Unknown,	3 12	....	Bagshaw.
	6	Logan	7	85	P. R. R.,	4 90	5 60	Goetz.
	6-7	Catharine,	10	25	Burning brush (j),	4 15	8 60	Hyle.
	7	Antis,	70	18	Unknown,	9 50	....	Keller.
	7	Frankstown,	25	100	Lumbering (a),	3 57	....	Gold.
	7-9	Logan-Antis,	300	900	Unknown (k),	65 90	1 50	Kapp-Yost-Seguin.
	7-9	Catharine,	500	200	Unknown,	7 63	....	Bagshaw.
	9	Frankstown,	6	70	Lumbering (a),	1 75	1 05	Gold.
			17,977	$19,743		$636 69	$102 85	

Note (*)—See also fire of same date in Schuylkill county.
Note (a)—Prosecution authorized by Attorney General. Case now pending.
Note (b)—Suit authorized by Attorney General. Case now pending.
Note (c)—Attorney General refused to act. Warden's bill of $17.20 paid by person responsible.
Note (d)—Attorney General refused to act. Settlement demanded of person responsible.
Note (e)—Settlement demanded of person responsible but not yet finally adjusted.
Note (f)—Boys and their parents called before fire warden and truant officer at Boy Scout Headquarters and reprimanded.
Note (g)—Six dollars of warden's bills paid by county commissioners. No proof that the second day's fire was caused by the first.
Note (h)—Settlement demanded from company responsible.
Note (i)—Building fired by upsetting of a lamp in a drunken brawl. Persons now in jail.
Note (j)—Settlement demanded from person responsible.
Note (k)—See also fire of same date in Cambria county.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
	BRADFORD COUNTY.						
Aug. 22	Burlington,	2	$20	Unknown,	$17 00	$0 75	Montgomery.
Nov. 7	Monroe,	25	7	L. V. (?),	....	1 00	Harbeson.
Dec. 1	Monroe,	20	5	L. V.,	....	1 00	Harbeson.
		47	$32		$17 00	$2 75	
	BUCKS COUNTY.						
April 12	Buckingham,	14	$14	P. & R.,	$3 50	....	Ewers.
30	West Rockhill,	9	60	Unknown,	4 10	....	Plank.
Oct. 28	West Rockhill,	10	....	Hunters (*),	12 00	....	Plank.
Dec. 7	Milford,	2	....	Unknown,	45	....	Buck.
		35	$74		$20 05	....	
	BUTLER COUNTY.						
Oct. 7	Washington,	60	....	Railroad (?),	$9 85	....	Seaton.
	CAMBRIA COUNTY.						
April 15	Lower Yoder,	2.5	....	Boys,	....	$1 80	Weller.
May 1	Blacklick,	.5	$5	P. R. R. (?),	$2 01	....	Gotshall.
1	Blacklick,	.5	5	P. R. R. (?),	2 69	....	Gotshall.
1	West Taylor,	200	200	Burning brush (†),	33 40	8 00	Weller.
1-2	Jackson,	2	20	Sawmill,	2 25	6 00	Weller.
9	Chest,	3	....	Lightning,	8 95	....	Gill.
10	Lower Yoder,	2.5	....	Unknown,	....	3 90	Weller.
11	Jackson,	1.5	7	P. R. R.,	5 95	4 20	Gotshall.
11	Yower Yoder,	1	....	P. R. R.,	....	45	Weller.
11	Adams,	.1	1	Campers,	1 15	....	Jamison.
12	White,	4	5	Unknown,	2 35	....	McKee.
13	Cambria,	10	10	P. R. R.,	1 45	60	Evans.
13	Cambria,	.1	1	Children,	85	....	Jamison.
14	Summerhill,	25	2,000	Unknown (‡),	7 75	6 00	Mulhollen.
21	West Taylor,	7.5	....	P. R. R.,	9 10	....	Weller.
21	West Taylor,	2	....	P. R. R.,	1 80	....	Weller.

July	29	Jackson,	.?		Smoker,	1 15		Diehl.
Oct.	16	Upper Yoder,	2	175	Hunters,	4 00		Weller.
	25	West Taylor,	1	5	Unknown,	98		Weller.
	29	Richland,	40	40	Railroad (?),	1 95		Ludwig.
Nov.	2	Dean,	3	5	Altoona Northern,	1 70		Seguin.
	8	Dean,	1	2	Altoona Northern,	95		Seguin.
	9	Lower Yoder,	3.5	95	Boys,	7 74	60	Weller.
	9-12	Jackson,	10	50	Hunters,	10 50		Fresh.
	12	Lower Yoder,	.?		Rubbish fire,	2 83		Weller.
	18-19	Washington,	2	2	Unknown,	8 06		Cassidy.
	27	Upper Yoder,	5	5	B. & O.,	5 05	1 50	Weller.
Dec.	6	Cresson,	75		P. R. R.,	4 90	2 10	Freidhof.
	7	Croyle,	5		Unknown,	3 55		Stutzman.
	7	Dean,	5		Altoona Northern,	2 45		Seguin.
	7-9	Dean,	200	600	Unknown (§),	3 75		Kapp-Yost-Seguin.
			614.7	$3,233		$139 75	$30 15	
		CAMERON COUNTY.						
Jan.	24	Lumber,	65	$65	Railroad (?),	$3 25		Horning.
April	7	Shippen,	20	25	Unknown,	6 10	$1 20	Evans.
	7	Shippen,	25	50	Burning brush (a),	9 90	1 60	Evans.
	7	Gibson,	.?		P. R. R.,	68		Nyce.
	10	Portage,	2		P. R. R.,		1 00	Evans.
	15	Gibson,	.?		P. R. R. (?),	98		Nyce.
	18-19	Gibson,	50		Unknown,	4 59		Nyce.
May	6	Shippen,	10		Unknown,	5 05	1 60	Powell.
	6	Grove,	20	80	P. R. R.,	3 25	4 00	Pitts.
	6-7	Portage-Lumber,	75		Unknown,	1 62	4 00	Evans.
	11-14	Grove-Gibson,	7,000	7,000	Incendiary (d),	78 70	195 90	Horning.
	11-14	Shippen,	300		Unknown,			Evans.
	11-16	Shippen,	500		Lumbering (b),	18 43		Peasley.
Aug. Sep.	21- 12	Gibson,	5	25	Burning brush (c),	64 00	105 00	Zerby.
Oct.	18-20	Shippen,	135	200	Unknown,		12 32	Evans.
			8,207	$7,445		$196 55	$326 62	
		CARBON COUNTY.						
April	5	East Penn,	1	$5	L. V.,	$1 78	$0 30	Kemmerer.
	7	East Penn,	18	126	L. V.,	4 63		Kemmerer.
	7	East Penn,	125	1,250	L. V.,	4 52	15	Kemmerer.
	12	East Penn,	4	20	L. V.,	2 83		Kemmerer.

Note (*)—Suspected parties written to and cautioned. Evidence not sufficient to hold.
Note (†)—Settlement demanded of person responsible. Not yet adjusted.
Note (‡)—Large loss due to fact that fire destroyed a sawmill.
Note (§)—See also fire of same date in Blair county.
Note (a)—Person responsible excused on account of extreme poverty.
Note (b)—See also fire of same date in Elk county.
Note (c)—Fire burned beneath the surface in mucky soil during very dry period.
Note (d)—See page 74.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
	CARBON COUNTY—Continued.						
16	Mauch Chunk-Penn, Forest-Franklin,	300	100	Burning brush (*),	41 75	3 00	Boyer.
April 16	Lower Towamensing,	50	500	Unknown,	20 20	....	Mehrkam.
16	Mauch Chunk,	400	....	Unknown,	5 25	....	Valentine.
19–20	Mauch Chunk,	250	150	Unknown,	22 20	....	Boyer.
20	Mauch Chunk,	500	500	Incendiary (?),	21 25	....	Boyer.
May 2	East Penn,	11	60	L. V.,	7 63	....	Kemmerer.
3	East Penn,	4	53	Unknown,	1 13	....	Kemmerer.
3	East Penn,	.1	....	L. V.,	44	....	Kemmerer.
6	East Penn,	60	300	L. V.,	1 78	....	Kemmerer.
6	East Penn,	12	72	L. V.,	8 25	....	Kemmerer.
6	East Penn,	6	24	L. V.,	2 68	....	Kemmerer.
11	East Penn,	15	90	L. V.,	9 00	1 20	Kemmerer.
12	Packer,	100	50	Boys (?),	1 15	6 90	Esser.
12	East Penn,	6	86	L. V.,	1 62	....	Kemmerer.
12	East Penn,						
12	East Penn,	3	15	L. V.,	3 93	90	Kemmerer.
Aug. 8	Lower Towamensing,	.5	....	L. & N. E.,	....	30	Peters.
Sept. 2	Franklin,	.3	10	Burning brush (†),	8 20	7 65	Neeb.
Oct. 26	Penn Forest,	50	25	Incendiary,	2 88	....	Snyder.
27	Packer,	2	....	Unknown,	1 45	....	Strunk.
Nov. 11	Packer,	50	....	Unknown,	5 10	....	Strunk.
11	Mauch Chunk,	75	200	Unknown,	11 86	....	Neeb.
11	Summit Hill,	50	63	Hunters,	8 61	....	Neumuller.
15	Lower Towamensing,	4	50	Unknown,	1 59	....	Green.
18	Summit Hill,	7	20	Hunters,	2 38	....	Neumuller.
Dec. 6–8	Penn Forest,	3,000	4,150	Unknown,	29 65	1 05	Neeb.
7	East Penn,	20	60	L. V.,	7 00	....	Kemmerer.
7–8	Packer,	342	500	Unknown,	79 45	....	Neumuller.
7–8	East Side,	2,000	2,000	Unknown,	55 64	45	Hofmann.
		7,465.9	$10,429		$376 73	$21 90	
	CENTRE COUNTY.						
April 17	Boggs,	1	....	P. R. R.,	....	....	Reese.
17	Boggs,	1	....	P. R. R.,	....	....	Reese.
18	Walker,	3	....	C. R. R. of Pa.,	....	....	Harnish.
18	Walker,						
18	Walker,						
18	Rush,	125	125	Unknown,	$10 38	....	Hess.
19	Rush,	....	....	False alarm,	8 76	....	Kelley.
21	Rush,	100	100	Fisherman,	3 62	....	McCord.
30	Snow Shoe,	20	50	Smoker (?),	31	....	McCartney.

May	1	Patton,	20	100	B. C.,	6 06	....	Thompson.
	1	Snow Shoe,	100	75	P. R. R.,	7 01	9 60	Uzzell.
	1	Curtin,	200	200	Mining engine,	....	....	Winkebleck.
	1-2	Boggs,	400	600	Burning brush (i),	32 32	....	Reese.
	5	Rush,	75	100	P. R. R.,	15 07	....	Pfoutz-Hoover.
	'5	Snow Shoe-Burnside,	125	112	Unknown,	3 66	....	Uzzell.
	8	Patton,	35	500	B. C.,	5 91	1 35	Thompson.
	9	Patton-Ferguson,	227	....	Unknown,	60 52	....	Thompson.
	9-16	Harris-Ferguson,	1,400	1,000	Unknown (a),	292 44	642 50	Morton.
	10-13	Haines,	55	30	Unknown,	65 37	73 20	Meek.
	11	Snow Shoe,	300	225	P. R. R.,	....	2 40	Sheeler.
	11-12	Boggs	200	150	P. R. R.,	6 06	....	Reese.
	11-13	Half Moon,	400	400	Unknown,	13 13	....	Harpster.
	11-13	Half Moon-Ferguson,	700	207	Burning brush (b),	46 92	....	Wrye.
	11-14	Haines-Miles,	3,550	3,000	Fishermen (c),	796 64	61 60	Silvius.
	12	Rush,	60	90	Mining engine (d),	5 98	....	McCord.
	12-13	Rush,	150	142	Mining engine (d),	4 17	9 00	McCord.
	12	Snow Shoe,	12	5	Mining engine (e),	....	4 50	McCartney.
	14	Snow Shoe,	25	25	Unknown,	9 06	2 00	Sheeler.
	16	Patton	18	164	B. C.,	2 31	....	Thompson.
Sept.	1	Penn,	4	....	Burning brush,	6 85	2 10	Meek.
Oct.	7	Rush,	25	12	Mining engine (f),	....	3 25	McCord.
	23	Rush,	25	20	Smokers,	10 90	....	Pfoutz.
	25	Rush,	145	145	Mining engine (g),	15 15	3 00	McCord-Hess.
	26	Curtin,	80	40	Mining engine (h),	....	9 60	Sheeler.
	27	College,	10	12	Unknown,	14 85	3 75	Keller.
	28	Rush,	50	20	Mining engine (g),	8 10	5 00	McCord.
	29	Rush,	14	64	Burning barn,	7 15	....	Hess.
	31	Curtin,	20	3	Mining engine (h),	....	6 60	Winkebleck.
Nov.	3	Curtin,	20	2	Mining engine (h),	....	2 20	Winkebleck.
	3	Potter,	.2	....	Hunters,	4 90	4 80	Montgomery.
	9	Rush,	100	100	P. R. R. (?),	7 75	32 00	Hoover.
	9	Rush,	15	10	Unknown,	4 46	....	Hess.
	20	Huston,	3	....	Hunters,	3 10	....	Mattern.
	23	Rush,	40	20	Smokers,	7 20	....	Hoover.
Dec.	6	Snow Shoe,	65	26	P. R. R.,	....	3 70	Sheeler.
	7	Rush,	100	50	Smokers,	9 25	....	Pfoutz.
	7-8	Burnside,	60	200	Hunters	50 05	9 00	Sheeler.
	8	Rush,	75	37	Mining engine (?),	3 85	....	Pfoutz.
			9,143.2	$8,161		$1,556 20	$891 15	

Note (*)—Person responsible excused on account of extreme poverty.

Note (†)—Person responsible excused on account of extreme poverty.

Note (a)—See also Huntingdon county. Two foresters, five rangers, and six fire wardens fought this fire. Two hundred and fifty students from State College worked without pay.

Note (b)—Person responsible excused on account of extreme poverty.

Note (c)—Two foresters, three rangers, and wardens Ruhl, Gramley, Brouse and Snyder.

Note (d)—Warden's bill of $10.15 paid by company responsible.

Note (e)—No bill submitted as Coal Company paid warden voluntarily.

Note (f)—Warden's bill of $3.25 paid by company responsible.

Note (g)—Bill for cost of extinction and damages presented to company. Not yet settled.

Note (h)—Fires extinguished by the company on their own land.

Note (i)—Person responsible excused on account of extreme poverty.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
	CHESTER COUNTY.						
April 18	South Coventry,	3	$30	Unknown,	$6 20	....	Essick.
June 17	South Coventry,	45	645	Unknown,	13 96	....	Essick.
Oct. 24	Valley,	4	....	Unknown,	2 52	....	Wirt.
Nov. 9	Valley,	2	....	Boys,	15	....	Wirt.
11-12	South Coventry,	400	4,012	Hunters,	31 20	....	Favinger-Woods.
		454	$4,687		$54 02	....	
	CLARION COUNTY.						
Nov. 4-5	Farmington,	4	$26	Unknown,	$5 80	....	Lyons.
8-9	Limestone,	3	....	Unknown,	7 55	$0 90	Spence.
		7	$26		$13 35	$0 90	
	CLEARFIELD COUNTY.						
April 22	Morris,	6	....	Railroad (?)	$3 72	....	Sarowy.
May 1	Knox,	3	....	N. Y. C.,	2 35	....	Stott.
4	Morris,	10	....	Boys,	12 43	....	Sarowy.
9-10	Huston,	20	$245	Unknown,	11 35	....	Kirk.
10	Penn,	.3	....	Fisherman,	....	....	Sizer.
10-12	Beccaria,	70	....	Burning brush (*),	18 00	....	Spangle.
10-13	Woodward,	300	400	Drilling rig (†).	49 90	$6 75	Moyer.
19	Huston,	15	15	Unknown,	9 45	2 00	Kirk.
21	Burnside,	25	250	N. Y. C.,	8 35	....	Conner.
21	Goshen,	10	20	Unknown,	4 33	1 00	Leigey.
21-22	Goshen,	20	40	Unknown,	4 82	1 00	Leigey.
Nov. 9	Decatur,	2	....	Unknown,	5 95	....	Sankey.
Dec. 7-8	Lawrence,	3,000	100	Hunters,	47 30	....	Goss.
8	Girard.	.5	1	Hunters,	....	15	Horning.
		3,481.8	$1,071		$177 95	$10 90	

CLINTON COUNTY.

Jan.	29	Chapman,	3	....	G. & P. R.,	....	$1 60	Critchley.
Mar.	30	Grugan,	5	....	P. R. R.,	....	4 80	Merrill.
April	5	Crawford,	50	$25	Lumbering,	$7 70	7 20	Metzger.
	6	Chapman,	20	....	P. R. R. (?),	....	9 60	Ryon.
	6-7	Colebrook,	150	150	P. R. R. (?),	....	32 60	Ryon.
	7	Colebrook,	12	240	Railroad (?),	4 15	4 50	Young.
	7	Colebrook-Bald Eagle,	160	800	P. R. R.,	....	....	Young.
	10	Grugan,	1	2	P. R. R.,	....	40	Ryon.
	13	Chapman,	.1	....	G. & P. R.,	....	40	Critchley.
	13	Leidy,	15	75	Unknown,	2 83	95	Caldwell.
	13	Colebrook,	2	5	P. R. R.,	....	2 40	Ryon.
	18	Woodward,	70	30	Unknown,	10 30	....	Reeder.
	18	Beech Creek,	100	75	Fisherman,	....	....	Winkebleck.
	18-19	Woodward,	200	400	Unknown,	58 90	6 80	Reilihan.
	18-19	Noyes,	75	75	Unknown,	10 15	....	Kepler.
	30	Wayne,	50	250	Unknown,	9 70	....	McKague.
	30	Wayne,	3.5	10	P. R. R.,	3 08	....	O'Donnell.
May	1	Leidy,	....	....	False alarm,	1 20	....	Wilson.
	1-2	Chapman,	120	300	Unknown,	....	36 00	Critchley.
	2	Colebrook,	200	2,000	P. R. R.,	3 06	32 00	Young.
	2-3	Beech Creek,	75	75	Unknown,	....	15 00	Winkebleck.
	2-4	Beech Creek,	600	500	Incendiary,	....	60 00	Winkebleck.
	6	Colebrook,	75	225	P. R. R.,	1 41	5 40	Young.
	8-9	Leidy,	5	2	Lightning,	8 35	5 40	Wilson.
	11	Wayne,	3	....	P. R. R.,	1 02	2 40	McKague.
	11-13	Wayne,	180	75	P. R. R.,	40 08	5 60	Hogentogler.
	11-14	Colebrook,	640	6,400	P. R. R.,	11 02	152 00	Young.
	11-14	Chapman,	1,600	3,000	G. & P. R. (?),	78 90	....	Critchley.
	12	Pine Creek,	12	624	Spark from chimney of house,	7 00	....	McKinney.
	12-13	Colebrook,	500	5,000	P. R. R.,	3 06	17 20	Young.
	13-14	Beech Creek,	300	300	Incendiary,	....	....	Winkebleck.
	14-15	Wayne-Crawford,	240	100	Unknown,	70 44	6 60	Hogentogler.
	20	Wayne,	18	....	Unknown,	4 33	....	McKague.
	31	Chapman,	.?	....	G. & P. R.,	....	....	Critchley.
Aug.	5	Grugan,	1	....	P. R. R.,	....	....	Merrill.
	6	Grugan,	.5	....	P. R. R.,	....	....	Merrill.
	22	Logan,	2	5	Unknown,	7 60	....	Hogentogler.
	22	Crawford,	2.5	10	Unknown (a),	42 40	6 00	Hogentogler.
Sept.	3	Greene,	.2	....	Unknown,	4 00	1 20	Hogentogler.
	4-9	Beech Creek,	1	5	Lightning (b),	7 45	9 50	Dutlinger.
Oct.	4-5	Chapman,	25	25	Logging engine (c),	5 85	....	Vansickle.
	10	Woodward,	5	2	Mining engine (d),	....	2 30	Reeder.
	11	Woodward,	30	12	Mining engine (d),	....	7 56	Reeder.
	12	Woodward,	80	16	Mining engine (d),	....	9 24	Reeder.
	12	Leidy,	75	25	Logging engine (c),	4 41	....	Wilson.

Note (*)—Person responsible excused on account of extreme poverty.
Note (†)—Settlement demanded of owner of land but not yet finally adjusted.
Note (a)—Burned in old bark peeling landing three feet deep.
Note (b)—Burned underground in swamp during very dry period.
Note (c)—Settlement demanded of owner. Not yet adjusted.
Note (d)—Company voluntarily paid warden's bills.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
	CLINTON COUNTY—Continued.						
Oct. 28	Leidy,	25	20	Hunters,	3 66	1 80	Muller.
Nov. 2-3	Wayne-Crawford,	150	150	Hunters,	40 20	7 00	Hogentogler.
2-3	Grugan,	37	25	N. Y. C.,	....	38 25	Blouse.
12	Leidy,	50	100	Unknown,	12 78	9 45	Muller.
20-22	Chapman,	100	100	Incendiary (*),	20 80	15 20	Critchley.
21	Grugan,	2	2	P. R. R.,	....	5 60	Blouse.
23	Beech Creek,	150	50	N. Y. C.,	....	....	Shoemaker.
Dec. 6-7	Leidy,	500	600	Burning house,	23 62	7 00	Muller.
7	Chapman,	25	25	Unknown,	....	2 00	Critchley.
7	Beech Creek,	80	20	Mining engine,	....	6 00	Winkebleck.
8	Chapman,	200	200	Hunters,	4 35	....	Critchley.
8-9	Gallagher,	275	3,200	Incendiary (†),	16 20	1 20	Neefe.
		6,700.8	$23,330		$529 40	$538 15	
	COLUMBIA COUNTY.						
May 9	Beaver,	25	$500	Unknown,	$8 45	....	Boone.
11-15	Jackson,	1,100	7,000	Unknown (a),	93 50	$13 05	Brush.
21	Main-Catawissa,	2,000	10,000	Unknown,	27 75	....	Yeager.
Sept. 4	Pine,	3	....	Clearing (b),	....	2 65	Shoemaker.
Oct. 8-9	Sugarloaf,	100	100	Unknown,	28 30	....	Hess-Getz.
27-28	Cunningham,	11	....	Mining engine (?),	11 10	....	Smith.
Nov. 6	Cunningham,	4	....	Mining engine (c),	3 08	1 50	Smith.
12	Locust,	5	125	Campers,	15 70	....	Craig.
		3,248	$17,725		$187 88	$17 20	
	CRAWFORD COUNTY.						
Aug. 30	Summit,	2	....	P. B. & L. E.,	....	....	Shurrager.
Oct. 6	E. Fallowfield,	750	....	P. B. & L. E.,	$4 75	$0 90	Langdon.
		752	....		$4 75	$0 90	
	CUMBERLAND COUNTY.						
Mar. 30	Cooke,	1	$1	P. & R.,	....	$1 54	Williams.
April 11	Cooke,	15	20	P. & R.,	$1 22	1 15	Williams.
16	South Middleton,	60	75	P. & R.,	....	24	Powers.
16	South Middleton,	?	....	P. & R.,	....	12	Powers.

April	17	South Middleton,	2	4	P. & R.,	83	1 00	Williams.
	24	Cooke,	3	6	P. & R.,	1 59	5 38	Williams.
May	6	Dickinson,	957	1,500	P. & R. (1),	18 55	24 50	Williams.
	10	Cooke,	3	4	P. & R.,	....	60	Williams.
	11	South Middleton,	.5	3	P. & R.,	....	27	Williams.
	21	Dickinson,	150	250	Tramps (?),	16 15	8 98	Williams.
June	2	Dickinson,	.5	....	P. & R.,	30	97	Powers.
July	7	Silver Spring,	5	10	Fire crackers,	4 60	....	Albright.
Oct.	28–29	Frankford,	30	45	Hunters,	6 55	....	Mountz.
Nov.	18	Frankford,	50	25	Unknown,	7 45	....	Stum.
	18–19	Hampden,	54	....	Hunter,	48 21	....	Waggoner.
	18–19	East Pennsboro,	15	....	Hunters,	26 74	9 20	Waggoner.
	20	Hampden,	18	....	Hunters,	17 54	....	Waggoner.
	21	Frankford,	.?	1	Hunter,	1 60	90	Mountz.
Dec.	2–3	Lower Mifflin,	150	75	Unknown,	24 50	....	Stum-Lightner.
	7	Hopewell,	3	....	Boy,	4 28	....	Rupp.
			1,517	$2,019		$180 01	$54 85	
		DAUPHIN COUNTY.						
April	7–8	Wiconisco,	400	$200	P. & R.,	$10 00	....	Williams.
	11	Wayne,	320	....	Lumbering (2),	20 30	....	Romberger.
	11	West Hanover,	350	3,000	Unknown,	31 24	....	Mumma.
	18	Middle Paxton,	100	200	P. & R.,	1 65	....	Hampton.
	18	Upper Paxton-Halifax,	155	306	P. R. R.,	17 00	$21 00	Mills.
	19–20	Williams,	125	125	P. & R.,	25 75	....	Williams.
	20	Upper Paxton,	66	112	P. R. R.,	6 10	28 00	Mills.
	28	Williams,	60	100	Unknown,	9 95	....	Knorr.
May	6	Washington,	74.5	....	P. R. R. (?),	3 75	30 00	Lentz.
	6	Upper Paxton,	13	39	P. R. R.,	1 75	12 80	Mills.
	11	Williams,	4	10	P. & R.,	5 68	....	Williams.
	12	Williams,	150	100	Unknown,	9 48	....	Williams.
	12-13	Williams,	850	65	Unknown,	22 04	....	Williams.
	13-14	Middle Paxton,	120	240	Unknown,	22 55	....	Lebo.
Oct.	17	Halifax,	3	....	Hunters,	45	....	Matter.
	17–18	Williams,	200	500	P. & R.,	25 50	....	Williams.
	26	Washington,	6	12	P. R. R.,	1 25	....	Lubold.
Nov.	1–3	Lower Paxton,	200	1,050	Hunters,	39 90	....	Hassler.
	3–4	Middle Paxton,	400	400	P. & R. (?),	21 00	....	Lebo.
	18–19	East Hanover,	7	7	Hunters,	2 60	....	Hampton.
			3,603.5	$6,466		$307 94	$91 80	

Note (*)—Highway foreman set fire to leaves in gutters and left them. Referred to Highway Dept.
Note (†)—Incendiary now in Lycoming county jail awaiting trial.
Note (a)—See also fires of same dates in Jordan township, Lycoming county, and Davidson, Sullivan.
Note (b)—Bill outlawed because not presented within sixty day limit. Settlement demanded.
Note (c)—Settlement demanded of company responsible. Not yet adjusted.
Note (1)—Bill for damages and costs of extinction presented to railroad but not yet settled.
Note (2)—Claim presented to company. Not yet settled.

TABLE I—*Continued.*

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		ELK COUNTY.						
April	18	Jay,	6	$2	P. R. R.,		$3 00	McLeod.
May	1	Jay,	8	3	P. R. R.,		2 70	McLeod.
	11-16	Benzinger,	500		Lumbering (1),	$18 42		Peasley.
	24-25	Fox,	30		P. S. & W.,	22 00		Smithbauer.
Aug.	1	Benezette,	.5	2	P. R. R.,		1 00	Zerby.
Oct.	3-12	Highland,	700	2,650	Bee hunters,	490 34		Amey-Blaisdell.
	7	Jay,	1.5	5	P. R. R.,	3 50		Zerby.
	12	Highland,	.5		Burning brush (2),	8 85	2 40	Blaisdell.
	29	Benezette,	3	2	Bee hunters (3),		7 60	Zerby.
	29	Benezette,	.1	1	Smokers,	4 20	2 70	Zerby.
Nov.	2-3	Highland,	3		Hunters,	24 25		Amey.
	8-9	Jones,	25	25	Hunters,	3 25	1 65	Markert.
	11	Benezette,	4	2	P. R. R.,			Zerby.
Dec.	7	Benezette,	100	100	Hunters,	9 25	5 20	Zerby.
			1,379.6	$2,792		$581 56	$29 75	
		FAYETTE COUNTY.						
April	20	North Union,	35	$400	Burning brush (a),	$24 62	$2 25	Beatty.
	20	Georges,	125	400	Burning brush,	9 85		Shanabarger.
	20	North Union,	.5		Incendiary,			Beatty.
	30	South Union,	300	500	Boys,	13 52		Beatty.
May	10	Stewart,	30	200	B. & O.,	7 70	1 50	Jackson.
	11	Bullskin,	20	100	Burning brush (b),	8 75	5 25	Myers.
	11	Henry Clay,	500	650	Burning brush (c),	21 06		Humberston.
	13-14	Bullskin,	104	624	Unknown,	19 95		Myers.
	14	North Union,	50	2,015	Boys,	12 80		Beatty.
Oct.	26-27	Henry Clay,	175	175	Logging engine (d),	13 00		Glisan.
	28-29	Springfield,	100	250	I. C. R. R. (e),	17 35	8 00	White.
	28-29	Bullskin,	200		Hunters,	8 20		Wingrove.
	28-30	South Connellsville,	60		Unknown,	22 05		Jaynes.
	29	Stewart,	50	100	Unknown,	8 66		Beatty.
	30-31	Wharton-Georges,	300		Incendiary,	23 02		West.
Nov.	1	Dunbar,	200	664	Hunters,	13 52	90	Beatty.
	2-3	Wharton,	750		Unknown,	44 83		West.
	3	North Union,	30		Incendiary,	2 46	90	Beatty.
	3 3	Bullskin,	6		Incendiary,	3 35		Wingrove.

	6	Bullskin,	2		Incendiary,		45	Wingrove.
	7	Springhill,	60	53	Unknown,	1 97	30	Ruble.
	8-9	Springhill,	700	1,016	Unknown,	25 18		Ruble.
	9	Bullskin,	25	100	Unknown,	12 55		Wingrove.
	20	Georges,	10		Unknown,	3 47		Beatty.
	27-28	Connellsville,	75		Hunters,	3 25		Wingrove.
			3,907.5	$7,247		$316 10	$19 55	
		FOREST COUNTY.						
Aug.	30-31	Jenks,	60		B. & O.,	$3 25		Eldridge.
Sept.	20	Howe,			B. & O.,	6 00		Booth.
Oct.	5	Jenks,			B. & O.,		$0 30	Eldridge.
	5-7	Jenks,	240		Unknown,	10 15	45	Eldridge.
	7	Jenks,	.?		B. & O.,			Eldridge.
	7	Brookston,	10		Unknown,		6 00	Booth.
	27	Jenks,	25		B. & O.,		1 30	Eldridge.
	29-30	Brookston-Howe,	2	$25	Children,	3 90		Booth.
			337	$25		$23 30	$7 95	
		FRANKLIN COUNTY.						
Mar.	18	Quincy,	1	$1	Incendiary,	$0 15	$0 18	Staley.
	27	Quincy,	15	30	Incendiary,	1 75	46	Staley.
	31	Guilford,	.?		C. V.,		18	Staley.
	31	Guilford,	.?		C. V.,		35	Staly.
	31	Guilford,	.?		C. V.,		18	Staley.
April	7	Quincy,	1	1	Incendiary,	34	18	Staley.
	12	Green,			False alarm,	1 61	1 92	Conklin.
	12	Quincy,	7.5	15	Incendiary,	27	27	Staley.
	15	Green,			False alarm,	91	6 18	Conklin.
	16	Green,	20	10	Unknown,	8 81	16 44	Conklin-Eckenrode.
	17	Quincy,	5.5	16	Incendiary,	94	36	Staley.
	17	Metal,	2		Incendiary,	2 33		Stains.
	18	Green,	15	15	Children,	5 73	6 26	Conklin.
	18	Peters,	.2		Steam roller,			Rupp.
	18	Guilford,	.?	2	C. V.,		1 87	Staley.
	18	Guilford,	.?		C. V.,		2 05	Staley.
	19	Quincy,	8.5	10	Incendiary,	87	27	Staley.
	20	Quincy,	7	21	Incendiary,	2 17	45	Staley.
	20-21	Peters-Warren,	75	150	Unknown,	19 67		Ensminger-Unger.
	26	Quincy,	1.5	4	Incendiary,	15	18	Staley.
	30	Quincy,	20	40	Incendiary,	1 20	8 23	Staley.

Note (1)—See fire of same date in Cameron county.
Note (2)—Warden's bill paid by person responsible.
Note (3)—Warden's bill voluntarily paid by persons responsible.
Note (a)—Attorney General refused to act. Settlement demanded of person responsible.
Note (b)—Warden's bill of $8.75 paid by person responsible.
Note (c)—Attorney General recommends prosecution. Case pending.
Note (d)—Settlement demanded of company responsible. Not yet adjusted.
Note (e)—Settlement demanded of railroad company. Not yet adjusted.

TABLE I—*Continued.*

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		FRANKLIN COUNTY—Continued.						
May	1	Green,	5	10	Unknown,	....	6 34	Conklin.
	1	Guilford,	3	6	Incendiary,	2 59	8 70	Staley.
	1	Quincy,	1	2	Incendiary,	30	18	Staley.
	2	Quincy,	1	2	Incendiary,	08	18	Staley.
	3	Guilford,	1	....	Incendiary,	....	4 96	Staley.
	4	Washington,	15	30	Incendiary,	2 70	90	Staley.
	5	Letterkenny,	.?	....	Unknown,	1 85	....	Newton.
	5	Quincy,	5	15	Incendiary,	75	....	Staley.
	8	Guilford,	4	8	C. V. (?),	15	9 88	Staley.
	9	Quincy,	3	9	Incendiary,	4 07	7 74	Staley.
	11	Quincy,	3	6	Incendiary,	75	18	Staley.
	11	Quincy,	50	200	Incendiary,	4 67	1 08	Staley.
	11	Quincy,	14	28	Incendiary,	1 50	90	Staley.
	11	Quincy,	15	15	Incendiary,	15	18	Staley.
	11	Quincy,	3	3	Incendiary,	60	8 46	Staley.
	11	Quincy,	2	4	Incendiary,	....	4 53	Staley.
	11	Letterkenny,	3	12	Unknown,	8 73	....	Rupp.
	11-12	Guilford,	350	350	Incendiary,	125 53	101 45	Staley.
	12	Quincy,	2	4	Incendiary,	90	54	Staley.
	12	Quincy,	5	10	Incendiary,	1 60	6 48	Staley.
	13	Peters,	.?	....	Children,	1 66	....	Kline.
	13	Quincy,	2	3	Incendiary,	30	36	Staley.
	13	Guilford,	4	6	Incendiary,	3 33	10 01	Staley.
	13	Quincy,	2	4	Incendiary,	30	36	Staley.
	13	Quincy,	6	9	Incendiary,	2 56	2 72	Staley.
	13-14	Quincy,	100	200	Incendiary,	25 15	60 18	Staley.
	14	Washington,	5	10	Campers,	2 42	18	Staley.
	26	Quincy,	8	8	Incendiary,	40	18	Staley.
Oct.	16	Letterkenny,	.?	....	Fisherman,	....	....	Rupp.
	17	Metal,	1	....	Hunters,	2 31	....	Horning.
Nov.	2	Peters,	20	20	Dinkey (*),	....	36 54	Rupp.
	2	Letterkenny,	50	50	Hunters,	111 68	5 20	Newton.
	2	Peters,	.?	....	Smoker,	....	....	Rupp.
	2	Letterkenny-Metal,	50	50	Unknown,	13 22	....	Horning-Horne-Wrights.
	4	Lurgan,	2	5	Unknown,	2 92	....	Sentman.
	9	Quincy,	.1	....	Incendiary,	....	25	Staley.
	9	Quincy,	5	15	Incendiary,	71	68	Staley.
	9	Quincy,	17	45	Incendiary,	3 90	16 14	Staley.

	12	Quincy.	.1	....	Incendiary (†).	....	[illegible]	Staley.
	19	Peters,	.3	1	Smokers,	3 42	1 20	Rupp.
	20	Quincy,	30	78	Incendiary,	5 48	2 40	Staley.
	21	Quincy,	10	20	Former fire,	....	66	Staley.
	22	Peters,	75	150	Hunter,	10 83	12 60	Rupp.
	27	Fannett,	60	....	Unknown,	13 45	....	Fegan.
	27-28	Fannett,	100	....	Unknown,	13 87	....	Lytle.
	28	Letterkenny,	20	10	Incendiary,	5 52	....	Rupp.
	28	Quincy,	2	6	Incendiary,	47	3 68	Staley.
	28	Quincy,	11.5	31	Incendiary,	1 53	7 30	Staley.
	28	Quincy,	2	16	Incendiary,	17	6 16	Staley.
Dec.	3	Fannett,	100	....	Unknown,	16 20	....	Fegan.
	4	Quincy,	5	10	Hunters,	92	81	Staley.
	5	St. Thomas,	150	305	Unknown,	49 15	....	Foreman-Seidel.
	6	St. Thomas,	30	110	Unknown,	19 51	....	Horne.
	6	Guilford,	2.5	15	Unknown,	6 95	4 26	Staley.
	6	Guilford,	3	15	Unknown,	10 36	4 37	Staley.
	7	Green,	.?	....	Unknown,	....	92	Conklin.
			1,525.7	$2,219		$511 90	$385 95	
		FULTON COUNTY.						
April	18	Bethel,	6	20	Traction engine (a).	$1 86	$1 20	Bishop.
	18	Ayr,	12	30	Sawmill (b),	....	25 76	Rupp.
	29	Ayr,	2.5	....	Unknown,	6 83	60	Harr.
	30	Brush Creek,	150	300	Incendiary (c),	15 46	....	Jackson.
May	9	Todd,	.?	....	Lightning.	2 16	....	Kerlin.
	13-14	Taylor-Wells,	200	158	Burning brush (d),	18 50	1 80	Keith-Stevens.
Nov.	2	Brush Creek,	45	....	Incendiary,	4 98	....	Jackson.
	2-4	Dublin,	350	1,400	Hunters,	103 32	....	Fraker-Free-Shore.
	3	Thompson,	1	....	Unknown,	2 28	....	Hann.
	10	Dublin,	20	45	Hunter,	19 18	2 40	Rupp.
	10	Licking Creek,	1	....	Unknown,	93	30	Hann.
	10	Brush Creek,	5	....	Hunters,	2 73	90	Jackson.
	12	Licking Creek,	10	....	Unknown,	3 03	....	Hann.
	17	Bethel,	15	45	Hunters (?),	27 44	3 00	Carnell.
	18	Ayr,	10	6	Incendiary,	11 10	75	Rupp.
	20	Brush-Licking Creek,	350	350	Unknown,	18 74	....	Hann-Jackson.
	21	Licking Creek,	20	....	Unknown,	2 13	....	Hann.
Dec.	6	Taylor,	2	8	Unknown,	6 73	....	Deaver-King.
			1,199.5	$2,362		$276 05	$36 71	

Note (*)—Warden's bill paid by the company responsible.
Note (†)—Set by Herman McFerren, deaf mute, Warrant for his arrest has been issued but constable has been unable to find him to date.
Note (a)—Attorney General refused case. Settlement demanded of owner. Not yet adjusted.
Note (b)—Owner voluntarily paid warden and men engaged in extinguishing this fire.
Note (c)—Case referred to Attorney General. Investigation ordered.
Note (d)—Settlement demanded of person responsible. Not yet adjusted.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
	HUNTINGDON COUNTY.						
April 3-4	Todd-Lincoln,	2,100	$2,000	J. & S. (a),	$67 77	$25 80	Black.
17	Clay,	2	10	E. B. T. (?),	....	1 80	Rupert.
18	Brady,	25	50	Tramp,	17 05	....	Bodine.
29	Morris,	75	25	Mining engine (b),	4 55	28 50	Morton.
30	Carbon,	50	....	Boys,	4 15	....	Donelson.
30-1	Cromwell,	100	540	Unknown,	70 20	4 50	Myers.
May 1-2	Union,	75	100	Mining engine (c),	14 80	9 00	Parker.
6	Union,	100	100	Unknown,	17 74	....	Black.
6	Penn,	20	....	Unknown,	90	....	Norris.
9-13	Jackson,	4,270	6,000	Unknown (d),	557 24	75 00	Morton.
10	Warriors Mark,	40	60	Sawmill,	7 32	12 75	Harpster.
11-12	Tell,	80	200	Sawmill (e),	32 61	4 95	Wiser.
12-13	Todd,	.5	40	J. & S. (f),	3 42	1 80	Saylor.
13	Logan,	10	10	Unknown,	6 10	....	Morton.
Nov. 2	Warriors Mark,	4	1	Burning leaves (g),	1 77	45	Geist.
2	Shirley,	.2	2	Unknown,	2 05	....	Hammond.
2	Warriors Mark,	50	12	P. R. R.,	1 93	80 00	Geist.
2	Oneida,	10	10	Unknown,	2 05	7 20	Morton.
2-3	Springfield,	200	500	Hunters,	51 50	....	Greene.
4	Wood,	30	60	Incendiary,	4 90	....	Keith.
7-8	Walker,	6	....	Hunters,	4 75	....	Robb.
9	Porter,	20	....	Unknown,	4 16	....	Green.
11-12	Todd,	.1	....	J. & S. (f),	....	3 20	Perry.
13	Tell,	15	15	Hunters,	8 71	....	Burdge.
17-18	Tell,	.5	1	Hunters,	8 76	....	Wiser.
19-20	Todd,	3	5	J. & S.,	2 50	5 20	Perry.
21	Henderson,	6	10	Unknown,	3 70	....	Hetrick.
26	Henderson,	12	5	Unknown,	3 85	1 20	Hetrick.
28-29	Dublin,	25	75	Unknown,	6 59	....	Peterson.
Dec. 2	Shirley,	20	20	Hunters,	13 84	7 52	Bodine.
7	Logan,	1.2	2	Hunters,	....	5 10	Morton.
7	West,	1	....	Hunters,	....	9 30	Morton.
8	West,	9	....	Hunters,	11 35	32 30	Morton.
8-9	Dublin,	250	265	Unknown,	27 15	....	Diven.
		7,610.5	$10,118		$963 41	$815 57	

		INDIANA COUNTY.						
May	14-15	East Wheatfield,	390	$3,200	Hot ashes (h),	$63 90	$10 90	Weller.
Oct.	30	West Wheatfield,	40	50	W. P. (?),	4 45	....	Gamble.
Nov.	9	Brush Valley,	20	150	Hunters,	9 10	....	Grow.
	9-10	East Wheatfield,	5	....	Railroad (?),	2 50	....	Troska.
Dec.	7	Rayne,	2	....	B. R. & P.,	1 75	....	Buchanan.
			457	$3,400		$81 70	$10 90	
		JEFFERSON COUNTY.						
Oct.	18	Beaver,	6	....	Hunters	$3 18	....	Boozer.
Nov.	7	Warsaw,	10	....	Unknown,	3 70	$0 75	Rhodes.
			16	....		$6 88	$0 75	
		JUNIATA COUNTY.						
Mar.	31	Milford,	10	$10	Lumbering (1),	$2 80	....	McCahan.
	31	Milford,	75	75	Lumbering (1),	2 50	....	Wetzler.
April	19-20	Beale-Milford,	1,200	220	Burning brush (2),	....	$60 72	McCahan-McKeen.
	30	Lack-Tuscarora,	1,675	3,350	Incendiary (3),	29 86	6 90	Bodine.
May	6-7	Fermanah,	300	650	Unknown,	57 05	3 30	Shellenberger.
	12-13	Susquehanna,	50	1,145	Sawmill (4),	23 07	1 50	Klinger.
	15	Milford,	10	10	Railroad (?),	....	17 25	Baltozer.
Sept.	6	Lack,	.?	....	Lightning,	1 60	....	Hammann.
Oct.	11-13	Fayette,	250	500	Loggers (5),	45 93	....	Lauver.
	26	Fermanagh,	.2	1	Hunters,	2 95	....	Shellenberger.
Nov.	2	Tuscarora,	1	10	Children (6),	....	3 30	McMeen.
	3	Tuscarora,	3	15	Hunters,	4 00	45	McMeen.
	11-12	Tuscarora,	100	45	Hunters,	12 10	....	Allen.
	11-12	Lack,	5.4	10	Hunters,	19 45	....	Lauthers.
	20	Lack,	3	....	Smoker,	3 40	....	Lauthers.
Dec.	6	Milford,	10	20	Unknown,	2 05	....	McCahan.
			3,692.6	$6,061		$206 76	$92 52	

Note (a)—Also fought by wardens Criswell, Scott and Norris.
Note (b)—Company paid warden's bill and $25 damage for State land burned over.
Note (c)—Attorney General refused case. Company paid warden's bill.
Note (d)—See also fire of same date in Centre Co.
Note (e)—Settlement demanded of owner of mill.
Note (f)—Referred to Attorney General No action taken.
Note (g)—State Highway foreman burning leaves along right of way on very windy day. Referred to Highway Department for action.
Note (h)—Fire destroyed several buildings. Settlement demanded from company responsible.
Note (1)—Company responsible paid cost of extinction and promised to improve conditions.
Note (2)—Warden's bill of $55.32 paid by person responsible.
Note (3)—See also fire of same date in Mifflin Co.
Note (4)—Settlement demanded of owners.
Note (5)—Under investigation. See also fire of same date in Snyder Co.
Note (6)—Teacher asked to caution children and distribute forest fire literature.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
	LACKAWANNA COUNTY.						
April 20	Ransom,	110	$300	Unknown,	$8 25	....	Beagle.
28-29	Spring Brook,	52	200	E. R. R.,	9 55	....	Haines.
30	Spring Brook,	500	500	Burning brush,	25 20	13 90	Kauffman.
30	Spring Brook,	500	250	Burning brush,	20 08	6 00	Kauffman.
May 1	Old Forge,	40	60	Unknown,	3 45	....	Beagle.
1-3	Clifton,	100	500	Unknown,	31 50	....	Smith.
9-10	Clifton,	90	500	Unknown,	24 25	....	Smith.
24	Ransom,	85	200	Smoker,	10 33	....	Beagle.
27	Ransom,	160	200	Unknown,	8 53	....	Beagle.
Aug. 23-24	Benton,	75	100	Unknown,	20 50	....	Wiedman.
Oct. 26	Roaring Brook,	600	200	Unknown,	5 65	....	Moore.
Dec. 6-9	Lehigh,	800	400	Hunters,	66 40	6 38	Kauffman.
		3,050	$3,410		$233 68	$26 28	
	LANCASTER COUNTY.						
April 18	Caernarvon-Salisbury,	300	$2,025	P. R. R. (?),	$41 38	....	Geist.
20	East Earl,	50	500	Railroad (?),	22 43	....	Geist.
		350	$2,525		$63 81	....	
	LEBANON COUNTY.						
April 18-19	South Lebanon,	100	....	Unknown,	$14 75	....	Horst.
18-19	Cornwall-S. Lebanon,	1,000	$1,200	C. & L. (?),	40 60	....	Nelson.
		1,000	$1,200		$55 35	....	
	LEHIGH COUNTY.						
April 19	Lynn,	15	$100	Unknown (1),	$5 58	$1 80	Rabert.
May 1	Salisbury,	40	250	Unknown,	9 25	....	Ludwig.
1	Upper Saucon,	30	300	Burning brush (2),	4 02	....	Mory.
6	Lynn,	106	300	Unknown,	5 35	....	Rabert.
12	Lynn,	75	200	Unknown,	22 27	6 45	Rabert.
21	Upper Saucon,	25	110	Unknown,	5 39	....	Mory.
Oct. 28	Salisbury,	3	....	Unknown,	2 95	....	Ludwig.
Dec. 7	Lynn,	150	300	Clearing (3),	20 60	16 50	Heffintrayer.
		443	$1,560		$75 41	$24 75	

LUZERNE COUNTY.

April	6	Dennison,	3	83	L. V.,	$1 85	....	Amend.
	12	Laurel Run,	12	25	Unknown,	8 75	....	Bower.
	18	Conyngham,	175	300	Sawmill (a),	32 30	....	Bloss.
	18	Dorrance,	100	....	Unknown,	3 43	....	Eckrote.
	18	Laurel Run,	15	100	Unknown,	15 45	....	Bower.
	18	Laurel Run,	50	1 25	Unknown,	23 05	....	Bower.
	19	Laurel Run,	100	200	Unknown,	37 45	....	Bower.
May	1	Dennison,	2	....	C. R. R. of N. J (?),	73	....	Amend.
	1	Bear Creek,	150	....	L. V.,	46 40	....	Bond.
	1	Laurel Run,	50	150	Unknown,	23 06	....	Bower.
	2-3	Wright-Fairview,	120	258	Unknown,	28 50	....	Williams.
	6	Bear Creek,	100	....	Unknown,	24 52	....	Bond.
	10	Dennison,	10	....	Children (b),	3 06	....	Amend.
	10	Fairmount,	60	800	Unknown,	8 90	$3 00	Blaine.
	10	Dennison,	14	320	C. R. R. of N. J.,	9 60	....	Amend.
	11	Dennison,	30	200	C. R. R. of N. J.,	1 40	....	Amend.
	11	Butler,	600	....	Unknown,	4 45	....	Eckrote.
	11-12	Ross,	1,200	6,000	Unknown,	53 90	....	Blaine.
	11-12	Fairview,	10,000	....	L. V. (c),	240 05	....	Bond-Conety.
	11-14	Buck,	900	3,000	Unknown,	116 75	....	Dutter.
	13-14	Wright,	100	250	Railroad (d),	....	15 70	Williams.
	14	Bear Creek,	20	....	Incendiary,	18 73	....	Bond.
	20	Bear Creek,	.5	....	L. V.,	....	30	Bond.
	21	Plymouth,	26	20	Unknown,	12 05	....	Warman.
Sept.	9	Black Creek,	.5	50	Hunters,	4 76	3 40	Wiener.
	14	Duryea Borough,	25	....	Mushroom pickers (?),	6 48	....	Frost.
	14	Duryea Borough,	15	....	Unknown,	4 02	....	Frost.
	19	Hazle,	4	....	Road workers (?),	3 25	30	Wiener.
	23	Laurel Run,	7	40	Unknown,	5 85	....	Bower.
Oct.	2	Duryea Borough,	12	....	Smokers,	1.54	....	Frost.
	12	Dennison,	4	....	C. R. R. of N. J.,	2 83	....	Amend.
	17	Laurel Run,	8	125	Hunters,	25 25	....	Bower.
	18-19	Wright-Fairview,	100	250	C. R. R. of N. J. (?),	11 05	1 50	Williams.
	21-22	Plymouth,	36	60	Unknown,	7 40	....	Warman.
	25	Hazle,	....	....	False alarm,	2 85	....	Wiener.
	28	Duryea,	2	....	Smokers,	58	30	Frost.
	30	Plymouth,	15	20	Unknown,	4 75	....	Warman.
Nov.	2	Fairmount,	4	11	Hunters,	8 25	50	Blaine.
	3	Dennison,	4	30	C. R. R. of N. J.,	1 92	....	Amend.
	9	Fairview,	40	160	L. V. (?),	5 96	1 50	Williams.
	8	West Wyoming,	6	....	Unknown,	2 50	....	Larish.
	9-10	Kingston,	200	....	Hunters,	4 00	....	Linskill.
	12	Duryea,	20	....	Smokers,	1 08	60	Frost.
	30	Laurel Run,	15	25	Unknown,	10 25	....	Bower.

Note (1)—Referred to Attorney General. Investigation authorized.
Note (2)—Warden's bill paid by person responsible.
Note (3)—Settlement demanded of person responsible. Not yet adjusted.
Note (a)—Settlement demanded of person responsible. Not yet adjusted.
Note (b)—Settlement demanded of parents but not yet adjusted.
Note (c)—Referred to Attorney General. Suit pending.
Note (d)—Bill outlawed because not presented within sixty day limit.

TABLE I—*Continued.*

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		LUZERNE COUNTY—Continued.						
Dec.	5-6	Plymouth,	140	350	Unknown,	33 63	....	Warman.
	6	Laurel Run,	10	30	Unknown,	10 65	....	Bower.
	6-8	Bear Creek-Bucks,	1,200	2,000	Hunters,	113 10	....	Bond.
	7	Laurel Run,	35	100	C. R. R. of N. J.,	25 25	....	Bower.
	7	Fairview-Wright,	50	100	Unknown,	8 60	6 00	Williams.
	7-8	Wilkes-Barre-Hanover,	70	130	Railroad,	10 02	....	Warman.
			15,859	$15,172		$1,020 67	$32 90	
		LYCOMING COUNTY.						
April	7	Lewis,	5	$2	P. R. R. (?),	....	$1 40	Wells.
May	9	Franklin,	12	50	Incendiary (a),	$15 70	....	Lunger.
	10-12	Cummings,	200	....	N. Y. C. (b),	6 55	61 88	Evans.
	11	Franklin,	40	560	Unknown,	16 60	3 00	Lunger.
	12	Lewis,	5	20	S. & N. Y.,	2 35	30	Weis.
	12	Gamble,	.5	50	Sawmill (c),	....	7 15	Eddy.
	12-13	Joran,	409	....	Unknown (d),	113 15	....	Fiester.
	13	Upper Fairfield,	3	....	Burning brush (e),	5 11	1 70	Bastian.
	13-14	Gamble,	14	....	Sawmill,	12 65	6 25	Bastian.
Aug.	24-25	McIntyre,	.2	1	Lightning,	3 35	....	Reed.
Sept.	11-12	Cascade,	20	....	Unknown,	13 75	....	Emick.
Oct.	11	Lewis,	.1	1	P. R. R. (?),	....	20	Wells.
	12	Cascade,	1	25	Unknown,	4.45	1 80	Moyer.
	30	McHenry,	2	10	Hunters,	5 10	2 40	Neefe.
Nov.	5	Armstrong,	100	100	Unknown,	5 95	....	Decker.
	13-14	Pine,	50	50	Hunters,.	18 60	4 40	Neefe.
	19-20	Washington,	1,920	....	Unknown,	77 87	9 90	Haer.
Dec.	6-7	Watson,	4	30	Hunters,.	5 40	....	Harer.
	7	Watson,	1	5	Railroad (?),	....	....	Neefe.
	7	Watson,	15	1	Incendiary (f),	15 20	3 48	Neefe.
Dec.	8	McHenry,	1	$5	Incendiary (f),	$0 45	....	Neefe.
	8	McHenry,	1	5	Incendiary (f),	45	....	Neefe.
	8	Cummings,	.1	5	Incendiary (f),	95	....	Neefe.
	8-9	Cummings,	600	2,000	Incendiary (f),	74 98	10 00	Neefe.
	8-9	McHenry,	150	600	Incendiary (f),	1 80	1 20	Neefe.
	8-9	Cummings-McHenry,	255	1,000	Incendiary (f),	13 60	1 60	Neefe.
	8-7	McHenry,	1,200	6,000	Incendiary (f),	25 15	14 20	Neefe.
			5,008.9	$10,520		$439 16	$130 88	

McKEAN COUNTY.

May	11	Keating,	12	$25	Burning brush, (1),	....	....	Emerick.
	11-14	Hamilton,	150	325	Burning brush (2),	$15 73	$5 70	Thunberg.
	11-15	Norwich,	400	....	Lumbering (?),	25 48	7 28	Evans.
Oct.	29	Hamlin,	10	15	Unknown,	6 38	....	Cummings.
Nov.	22	Smethport,	18	16	Unknown,	1 28	1 80	Cummings.
Dec.	9	Keating,	35	25	Unknown,	9 54	....	Cummings.
			625	$406		$58 41	$14 78	

MERCER COUNTY.

Nov.	3	Worth,	6	....	Unknown,	....	$8 50	Buckley.

MIFFLIN COUNTY.

April	18-19	Granville,	100	$100	Stave mill (3),	$4[illegible] 15	$2 25	Shahen.
	20	Bratton,	200	200	Incendiary,	13 65	....	Kauffman.
	29	Armagh,	1	1	P. R. R.,	....	3 76	Meek.
	30	Bratton,	1,875	3,750	Incendiary (4),	172 56	21 00	Bodine.
May	6	Armagh,	.1	....	P. R. R.,	....	90	Meek.
	6	Armagh,	20	20	P. R. R.,	14 93	38 25	Meek.
	9	Armagh,	2	6	P. R. R.,	2 78	7 50	Hironimus.
	9	Armagh,	....	....	False alarm,	9 45	26 83	Warfield.
	13	Brown,	.1	1	Unknown,	....	30	Rhoades.
	13	Granville,	40	40	Unknown,	16 55	2 75	Price.
Sept.	10	Armagh,	.1	1	Burning auto,	....	1 55	Warfield.
	13	Union,	.1	....	Unknown,	....	....	Bietsch.
Oct.	30	Menno,	32.5	35	Hunters,	17 43	3 10	Yoder.
	30	Union,	.5	2	Incendiary,	11 57	2 60	Yoder.
Nov.	18	Armagh,	4	4	P. R. R.,	68	2 80	Meek.
	18	Armagh,	.1	....	P. R. R.,	38	....	Meek.
	22	Armagh,	1	2	Hunters,	2 68	5 20	Warfield.
	25-26	Decatur,	150	75	Hunters,	17 95	....	Kemberling.
Dec.	5-6	Wayne,	45	57	Unknown,	32 95	1 20	Sechrist.
			2,471.5	$4,294		$256 61	$118 88	

Note (a)—Referred to Attorney General who advised not to prosecute. Claim presented.
Note (b)—Case refused by Attorney General.
Note (c)—Warden's bill of $4.15 paid by persons responsible.
Note (d)—See also fire of same date, Columbia and Sullivan counties.
Note (e)—Settlement demanded of person responsible but not yet finally adjusted.
Note (f)—Frank Holden, Lucullus, Pa., set twenty-five fires. Some of these burned together and are reported as one fire. Holden confessed and is now in Lycoming county jail.
Note (1)—Settled Oct. 3, 1916, by payment of costs of suit and damages amounting to $46.50.
Note (2)—Settlement demanded of person responsible but not yet adjusted.
Note (3)—No evidence. Owner does not believe his mill responsible but has made everything right with persons damaged and promises care in future.
Note (4)—See also fire of same date in Juniata county.

TABLE I—*Continued.*

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		MONROE COUNTY.						
April	3	Paradise,	18	$10	Unknown,	$3 20		Shaller.
	6	Barett,	3	3	D. L. & W.,		$1 80	Whittaker.
	11	Paradise,	.5	2	D. L. & W.,		45	Shaller.
	12	Pocono,	10		D. L. & W.,	3 80		Learn.
	15	Barrett,	4	10	D. L. & W.,		1 20	Whittaker.
	16	Barrett,	15	15	D. L. & W.,		2 70	Whittaker.
	19	Jackson,	10	60	E. R. R.,	5 75	2 55	Clugston.
	21	Barrett,	30	30	D. L. & W.,	83	2 80	Whittaker.
	29	Coolbaugh,	.5	2	D. L. & W.,		30	Shaller.
May	1	Price,	150	175	D. L. & W.,	5 54		Haase.
	3	Chestnuthill,	25	15	Unknown,	60	50	Herman.
	3				False alarm,	3 45		Herman.
	6	Coolbaugh,	15		D. L. & W.,	15 69	1 60	Shaller.
	9	Pocono,	.2	25	W. & E.,		15	DeHaven.
	9	Hamilton,	100	150	Sawmill (*),	17 06	2 40	Brewer.
	11	Coolbaugh,	60	250	D. L. & W.,	27 39	1 40	Shaller.
	11	Pocono,	125	375	Unknown,	41 30	3 60	DeHaven.
	13	Tunkhannock,	300		For berries,	5 63	2 00	Herman.
	16	Tunkhannock,	50		For berries,	4 42	5 70	Herman.
	20	Coolbaugh,	.5	1	D. L. & W.,	68		Shaller.
Aug.	22	Tunkhannock,	.1		W. B. & E.,		90	DeHaven.
Sept.	10	Middle Smithfield,	20	75	D. V.,	7 75	1 20	Mosier.
Oct.	12	Coolbaugh,	.5	2	Unknown,	1 60		Shaller.
	4	Coolbaugh,	.?		Unknown,		30	Shaller.
	15	Barrett,	2	3	D. L. & W.,		1 20	Whittaker.
	25	Barett,	.7	1	Hunters,		48	Whittaker.
	28	Polk,	.?		Hunters,	1 02		Snyder.
	26	Smithfield,	2	2	Unknown,		50	Lash.
	30	Tunkhannock,	.2	25	Hunters,		90	DeHaven.
	31	Smithfield,	1		Burning rubbish,		13	Lash.
Nov.	3	Stroud,	1.5	5	Hunters,	1 90		Brewer.
	4	Hamilton,	2	8	Hunters,	3 25	90	Brewer.
	9	Paradise,	1	1	Unknown,	1 87		Shaller.
	10	Coolbaugh,	1.5	1	Unknown,	15	90	Shaller.
	11	Barrett,	.5	1	D. L. & W.,		25	Whittaker.
	11	Barrett,	20	5	D. L. & W.,		5 20	Whittaker.
	12	Middle Smithfield	2		Unknown,	3 43	45	Strobeck.

		Barrett,	3	2	D. L. & W.,		10	Whittaker.
	22	Middle Smithfield,	25	25	Unknown,	7 30		Mosier.
	27	Barrett,	.5	1	D. L. & W.,		25	Whittaker.
Dec.	6	Barrett,	50	25	D. L. & W.,	1 25	18 00	Whittaker.
	7	Pocono,	4	10	Unknown,	10 15	1 20	Learn.
	7	Paradise,	75	75	D. L. & W.,		27 00	Strobeck.
			1,128.2	$1,334		$174 95	$89 01	
		MONTGOMERY COUNTY.						
Nov.	4	Upper Merion,	10		Hunters,			Morris.
	11	Springfield,	1		Railroad (?),			Morris.
			11					
		NORTHAMPTON COUNTY.						
Dec.	8	Upper Mt. Bethel,	.4		Incendiary,	$2 80		Cooper.
		NORTHUMBERLAND COUNTY.						
April	15	Snydertown,	8	$20	P. & R.,	$3 75	$2 25	Wagner.
	16	W. Chillisquaque,	50		Campers (a),		28 50	Heddings.
	18	Snydertown,	35	200	P. & R.,	11 35	9 75	Wagner.
May	12	Snydertown,	24	250	Burning brush (b),		8 00	Wagner.
	14	Shamokin,	210		Unknown,	26 05		Swank.
Oct.	25	Coal,	3	3	Unknown,	2 95		Strausser.
Nov.	11	Mount Carmel,	10		Unknown,	4 89		Smith.
	12	Mount Carmel,	2		Unknown,	68		Smith.
	25	Lower Augusta,	.5		P. R. R.,	35		Snyder.
Dec.	6	Lower Augusta,	8	75	P. R. R.,	4 45	3 60	Phillips.
	6	Mount Carmel,	300		Unknown,	18 40		Smith.
	6	Upper Augusta,	1	10	P. R. R.,	1 33	1 80	Snyder.
	8	Shamokin,	4	20	Railroad,	5 35		Snyder.
			655.5	$578		$79 55	$53 90	
		PERRY COUNTY.						
April	18	Center,	30	$150	N. & S. V.,	$11 78	$1 35	Fry.
	18	Center,	25	225	Burning brush,	10 23		Fry.
	20	Juniata,	26	402	Unknown,	13 25	45	Reisinger.
	30	Penn,	5	50	Unknown,	3 25	1 20	Nickum.
May	6	Center,	20	40	N. & S. V.,	5 95	2 70	Dile.
	7	Saville,	3	30	Unknown,	3 85	45	Reisinger.
	8	Toboyne,	.7		Unknown,		2 50	Bryner.
	20-21	Center,	8		Unknown,	6 00		Fry.
Aug.	23-24	Liverpool,	.5		Lightning,	4 90		Grubb.

Note (*)—Settlement demanded from owner but not yet finally adjusted.
Note (a)—Campers helped to extinguish fire and voluntarily paid warden's bill of $28.50.
Note (b)—Warden's bill of $6.50 paid by person responsible.

TABLE I—*Continued.*

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		PERRY COUNTY—Continued.						
Nov.	2	Miller,	4	4	Hunters,	5 80	....	Houck.
	4	Toboyne,	.5	5	Hunters,	1 39	....	Bryner.
	9	Madison,	50	....	Unknown,	7 45	....	Hench.
	11	Buffalo,	3	17	Hunters (*)	....	1 15	Rhoads.
	11-12	Penn,	70	300	Unknown,	7 90	....	Nickum.
	11-13	Tuscarora,	50	15	Hunters (?),	55 10	....	Kremer.
			290	$1,238		$136 84	$9 80	
		PIKE COUNTY.						
April	3	Lehman,	4	$2	Smoker (†),	....	$1 00	Mink.
	18	Lehman,	20	5	Fisherman,	6 40	....	Stout.
	20	Lehman,	4	2	Fisherman,	1 89	....	Strobeck.
May	10	Palmyra,	100	100	Unknown,	4 45	....	Stadden.
	12	Lackawaxen,	150	300	E. R. R.,	....	15 75	Stadden.
	13-14	Milford-Shohola,	200	600	Unknown,	44 55	3 40	Drake.
Oct.	18-19	Westfall,	25	....	Hunters,	40 93	1 20	Drake.
Nov.	2-3	Westfall,	50	....	Hunters,	36 92	60	Drake.
	7-8	Greene,	3	....	Hunters,	11 75	....	Gilpin.
	22	Lehman,	75	60	Unknown,	14 38	....	Stout.
Dec.	7	Porter,	40	40	Hunters,	1 02	4 20	Strobeck.
	7-8	Palmyra,	500	1,000	Unknown,	24 40	....	Gumble.
	8	Porter,	1,500	2,000	Hunters,	13 75	4 50	Avery.
	8	Lackawaxen,	100	....	Hunters,	10 15	....	Rosencrance.
	7-8	Lackawaxen,	50	100	Unknown,	4 08	....	Simonson.
	8	Westfall,	50	250	Unknown,	3 85	....	Manwaring.
			2,871	$4,459		$218 52	$30 65	
		POTTER COUNTY.						
April	11	Stewardson,	2	$20	Unknown,	$2 37	$1 20	Golden.
	11	Stewardson,	10	5	Burning building,	3 25	2 00	Caldwell.
	16	Eulalia,	30	15	Burning brush (a),	8 80	3 30	Emerick.
May	2	Abbott,	.2	....	Fishermen,	90	....	Van Horn.
	4-7	West Branch,	1,000	2,500	Unknown,	4[illegible] 45	108 00	Connble.
	9-10	Abbott,	5	....	Unknown,	5 95	....	Niklaus.

	10-11	Sharon,	20	10	Burning brush (b),	2 52	....	Scoville.
	10-11	Pike,	20	25	Burning brush (c),	8 38	2 85	Page.
	10-12	Pike-Ulysses,	10	....	Unknown,	11 88	1 06	Page.
	11	Abbott,	.1	....	Fishermen,	....		90 Van Horn.
	11	Keating,	.2	....	B. & S.,	5 33	....	Fox.
	11	Portage,	1	2	B. & S.,	....	....	Fox.
	11-13	Abbott,	180	450	Burning brush (d),	73 00	21 00	Van Horn.
	11-12	Homer,	80	....	Sawmill (e),	12 25	12 00	Quimby.
	11-12	Sweden,	400	200	Unknown,	19 32	2 00	Snyder.
	11-12	Summit,	50	50	Burning brush, (f),	21 85	2 88	Baker.
	11-13	Summit,	125	300	Burning brush (g),	68 85	14 40	Ayers-Baker.
	11-13	Ulysses-Pike-West Branch,	10,400	6,400	Incendiary (?),	163.63	448 75	Leach.
	11-13	Wharton,	50	102	Fishermen (?),	16 89	....	Fox.
	11-14	Hector,	150	100	Burning brush (h),	21 65	7 20	Mays.
	11-14	Wright,	100	102	B. & S. (?),	18 20	....	Wright.
	11-14	Pike-Ulysses,	500	250	Unknown,	47 45	....	Mays.
	12	Pike,	50	50	Unknown,	16 09	1 20	Page.
	12	Keating,	1	....	B. & S.,	3 53	1 50	Fox.
	13-14	Eulalia,	65	125	C. & P. A. (i),	34 55	7 50	Matteson-Mosch.
Sept.	3	East Fork,	.1	....	Lightning,	....	2 00	Van Horn.
Oct.	18	Stewardson,	.5	1	Hunters,	2 06	80	Golden.
	29-30	Oswayo,	100	110	Unknown,	24 55	....	Kemp-Bunker.
	29-30	Allegany,	25	25	Hunters,	12 25	....	Mosch.
Nov.	2-3	Abbott,	10	1	Burning brush (j),	4 75	2 84	Bratz.
			13,385.1	$10,843		$645 69	$643 37	
		SCHUYLKILL COUNTY.						
April	12-13	East Norwegian,	10	$700	Mining engine,	$17 65	....	Weiss.
	17-18	New Castle,	25	250	Unknown,	55 85	....	Weiss.
	18	Barry-Butler,	50	50	P. & R.,	15 40	....	Maurer.
	18-19	Hegins,	350	....	Sawmill (k),	65 11	....	Morgan.
	19	Blythe,	20	150	P. R. R.,	4 10	$21 00	Weiss.
	19	Rahn,	500	500	Unknown,	13 05	....	Neumiller.
	20	West Mahanoy,	100	50	Mining engine,	5 15	....	Heffner.
	29	East Norwegian,	20	3,00	Unknown,	18 25	....	Weiss.
	30	East Norwegian,	1	....	Boys,	7 00	....	Weiss.
May	2	Ryan,	1	....	Fishermen,	2 07	....	Ellis.
	5	East Norwegian,	10	....	Min'ng engine,	17 45	....	Weiss.
	11	West Brunswick,	200	1,000	Railroad (l),	17 06	....	Moyer.

Note (*)—Bill outlawed because not presented within sixty day limit.
Note (†)—Bill outlawed because not presented within sixty day limit.
Note (a)—Referred to Attorney General. Warrant issued for guilty party who immediattely left for "parts unknown."
Note (b)—Settlement demanded of person responsible but later withdrawn because fire was on his own land and was extinguished by himself and his own men.
Note (c)—Settlement demanded of person responsible but not yet finally adjusted.
Note (d)—Attorney General refused case. Settlement demanded of person responsible.
Note (e)—Settlement demanded of owner of mill but not yet finally adjusted.
Note (f)—Prosecution ordered by Attorney General. Aged defendant plead guilty. Sentence suspended upon payment of costs of prosecution, $14.45.
Note (g)—Settlement demanded but case later dropped because of insufficient evidence.
Note (h)—Settlement demanded of person responsible but not yet finally adjusted.
Note (i)—Warden's bill of $34.55 paid by the railroad company.
Note (j)—Settlement demanded of person responsible but not yet adjusted.
Note (k)—Claim presented to owner of mill but not yet settled.
Note (l)—See also fire of same date in Berks Co.

TABLE I—*Continued.*

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		SCHUYLKILL COUNTY—Continued.						
May	12	Ryan,	4	200	Fishermen,	4 61	....	Ellis.
	12	East Brunswick,	10	100	L. V.,	2 90	....	Turner.
	13-14	West Brunswick,	800	950	P. & R.,	23 70	....	Koenig.
	21	North Manheim,	600	800	Unknown,	23 15	....	Koenig.
	22	North Union,	3	75	Child (1),	7 59	....	Wharmby.
	22	West Mahanoy,	20	90	Unknown,	7 05	....	Heffner.
Sept.	30	Kline,	10	....	Unknown,	4 67	....	Bruno.
Oct.	1	Kline,	14	....	Unknown,	4 38	....	Bruno.
	29	East Union,	10	....	Unknown,	3 55	90	Peiffer.
Nov.	2	Washington,	1	....	Hunters,	....	15	Kemmerling.
	3	West Penn,	10	20	L. V.,	3 70	2 85	Staudt.
	3	West Penn,	2.5	25	L. V. (?),	2 46	....	Staudt.
	3	Union,	1	....	Unknown,	3 50	....	Shoup.
	9-10	East Norwegian,	7	50	Unknown,	6 25	....	Weiss.
	11-12	East Norwegian,	10	20	Mining engine,	10 75	....	Weiss.
	19	Butler,	20	40	Trespassers,	7 12	3 15	Dawes.
	26	Butler,	.2	3	Trespassers,	1 56	45	Dawes.
	26	Butler,	6	20	Trespassers,	2 01	....	Dawes.
Dec.	6	West Penn,	1	....	L. V.,	53	....	Staudt.
	6	West Penn,	20	40	L. V. (?),	3 06	....	Staudt.
	6	Butler,	2	50	P. & R.,	3 65	6 00	Conner.
	7	West Penn,	40	80	L. & N. E. (?),	6 28	....	Staudt.
	6-7	Kline,	200	200	Unknown,	18 20	....	Bruno.
	7	Butler,	12	25	P. & R.,	4 25	4 80	Conner.
	8	West Mahanoy,	2	3	Trespassers,	1 26	....	Dawes.
			3,092.7	$8,491		$394 31	$39 30	
		SNYDER COUNTY.						
April	16	West Perry,	33	....	Unknown,	$42 85	$2 00	Amig.
	29	Adams,	390	500	Incendiary,	11 85	6 60	Bartschat.
May	6	West Perry,	100	60	Unknown,	8 80	....	Strawzer.
	11	Franklin,	4	40	Sawmill (2),	11 36	3 75	Reigle.
Aug.	8	Adams,	.2	....	Bee hunters,	3 06	2 00	Bartschat.
Oct.	11-13	West Beaver,	550	....	Smoker (3),	57 20	....	Marks.
Nov.	9	West Beaver,	3	5	P. R. R.,	1 45	....	Marks.
	26	Adams,	15	....	Hunters,	....	3 60	Bartschat.
Dec.	6-8	Adams-Centre,	1,200	850	Incendiary (4),	101 66	42 00	Bartschat.
			2,205.2	$1,455		$238 22	$59 95	

SOMERSET COUNTY.

April	20-21	Shade,	100	$500	Lumbering (a),	$4 75	....	Wechtenhiser.
May	1-2	Summit,	60	25	Lumbering (b),	2 76	$12 75	Engle.
	12	Elk Lick,	.2	3	Lumbering (b),	1 38	....	Engle.
	16	Elk Lick,	.3	3	Lumbering (b),	2 73	....	Engle.
	16	Northampton,	30	1	Unknown,	3 96	....	Brick.
June	1	Jefferson,	.5	1	Burning brush (c),	2 20	30	Bearer.
Oct.	27	Fairhope,	50	50	Unknown,	7 32	....	Emrick.
	28-29	Middlecreek,	75	75	Unknown,	9 98	....	Barron.
	30	Stonycreek,	3	10	Smokers,	2 45	....	Bearer.
Nov.	2-3	Ogle,	40	....	Unknown,	8 95	....	Whitaker.
	2-3	Addison,	200	200	Unknown,	31 98	....	Merrill.
	2-3	Jenner,	40	105	Unknown,	16 15	....	Baker.
	3	Fairhope,	30	60	Hunters,	7 33	....	Emrick.
	3	Middlecreek,	40	400	Unknown,	6 08	....	Barron.
	3-4	Northampton,	200	230	Hunter,	7 98	....	Beachy.
	8-9	Middlecreek,	300	1,500	Unknown,	18 35	....	Barron.
	12	Paint,	15	203	Railroad (?),	11 65	1 20	Holsopple.
	13	Northampton,	60	25	Unknown,	7 95	....	Brick.
	16-17	Lincoln,	35	95	Unknown,	12 00	....	Baker.
	18-19	Southampton,	100	100	Hunters,	6 03	....	Troutman.
	19	Addison,	20	32	Burning house,	4 32	....	Merrill.
	21	Quemahoning,	6	....	B. & O. (?),	2 65	30	Brant.
Dec.	7	Shade,	5	25	Child (d),	2 65	90	Manges.
	8	Conemaugh,	30	600	Unknown,	17 10	....	Benson.
Oct.	22-23	Elk Lick,	500	300	Incendiary,	....	7 00	Stevanus.
			1,940	$4,533		$197 58	$22 45	

SULLIVAN COUNTY.

April	12	Cherry,	.5	....	Campers,	....	....	D. Morter.
	15	Cherry,	.2	....	W. & N. B.,	....	....	D. Morter.
	19	Cherry,	30	$90	L. V. (?),	$7 75	....	McGee.
	19	Cherry,	10	20	Unknown,	2 35	....	McGee.
	19-20	Cherry,	80	....	L. V.,	5 06	....	C. Morter.
	21	Cherry,	21	....	L. V.,	....	....	C. Morter.
	21	Cherry,	3	6	Unknown,	3 70	....	McGee.
	30	Cherry,	4	....	Incendiary,	2 95	....	D. Morter.
May	9-13	Davidson,	....	....	Unknown (e),	27 55	....	Gorman.
	11-12	Cherry,	20	....	L. V.,	3 85	....	D. Morter.
	11-12	Laporte,	30	120	W. & N. B.,	58 66	....	Gorman.
	12	Cherry,	3	....	L. V.,	2 65	....	C. Morter.

Note (1)—Excused because of extreme poverty of guardian.
Note (2)—Settlement demanded of persons responsible but not yet finally adjusted.
Note (3)—See also fire of same date in Juniata county.
Note (4)—See also fire of same date in Union county.
Note (a)—Settlement demanded of persons responsible but not yet finally adjusted.
Note (b)—Evidence insufficient for a prosecution but responsible company warned.
Note (c)—Warden's bill of $2.20 paid by person responsible.
Note (d)—Warden's bill of $2.65 paid by parent of child, Jan. 3, 1917.
Note (e)—See also fire of same date in Lycoming and Columbia counties.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
	SULLIVAN COUNTY—Continued.						
May 12-13	Forks,	100	....	Fishermen,	13 45	$19 80	Kester.
13-14	Davidson,	6	....	W. & N. B.,	4 75	....	Gorman.
13-14	Cherry,	48	25	W. & N. B.,	11 80	1 65	D. Morter.
13-14	Eaglesmere,	.5	....	S. & E.,	1 75	....	Aumiller.
Sept. 10-15	Shrewsbury,	20	....	W. & N. B.,	16 75	....	Aumiller.
Oct. 19	Colley,	2	....	Hunters (?),	5 80	....	Kille.
23	Cherry,	4	....	Incendiary,	1 15	....	D. Morter.
Nov. 6	Cherry,	4	....	Unknown,	....	....	C. Morter.
9	Cherry,	6	15	L. V.,	3 55	....	C. Morter.
Dec. 6-7	Cherry,	50	10	L. V.,	1 92	7 50	C. Morter.
6-7	Cherry,	100	....	L. V.,	4 93	6 40	C. Morter.
		542	$286		$180 36	$35 35	
	SUSQUEHANNA COUNTY.						
Dec. 7	Bridgewater,	25	....	L. V.,	$2 95	....	Payne.
	TIOGA COUNTY.						
April 7	Elk,	10	$10	Lumbering (a),	....	$2 30	Harbeson.
18-19	Shippen,	40	....	Unknown,	$10 60	4 60	Peters.
May 1-3	Shippen,	1,100	....	Burning brush (b),	21 73	13 30	Peters.
3-4	Morris,	2	2	E. R. R. (c),	1 92	1 10	Keller.
9-10	Morris,	1	1	Lightning,	3 13	....	Keller.
11-12	Lawrence,	30	20	Unknown,	26 88	....	Brown.
11-13	Shippen,	90	150	Incendiary,	22 03	2 15	Payne.
11-13	Shippen,	101	25	N. Y. C. (d),	8 37	5 10	Peters.
12-13	Gaines,	50	....	Burning brush (e),	....	11 35	Smith.
Aug. 18-24	Hamilton,	110	100	Unknown,	47 20	....	Higland.
19-23	Shippen,	8	75	Burning brush (f),	14 95	....	Payne.
Sept. 4	Delmar,	5	20	Unknown,	6.55	....	Torpy.
Nov. 16	Morris,	.1	....	Railroad (?),	....	18	Campbell.
Dec. 8-9	Pine,	1,000	500	Hunters,	40 25	6 80	Harbeson.
		2,547.1	$903		$203 61	$46 88	

UNION COUNTY.

April	19-20	Lewis,	300	$300	Unknown,	$68 40	$13 68	Metzger.
	29	Hartley,	.5	1	P. R. R.,	....	15	Meek.
May	6-7	West Buffalo,	300	600	Lumbering (?),	33 65	9 12	Metzger.
	10	Hartley,	1	5	Lightning,	2 55	2 40	Silvius.
	10-11	Lewis,	85	100	Smoker,	30 87	13 80	Winter.
Oct.	25-26	Buffalo,	10	100	Hunter,	5 95	....	Depo.
Nov.	18	Hartley,	1	2	P. R. R.,	4 49	....	Meek.
	23-24	Limestone,	5	150	Hunters,	10 90	....	Brouse.
Dec.	6-8	Hartley-Lewis,	200	150	Incendiary (1),	17 00	....	Bartschat
			902.5	$1,408		$173 81	$39 15	

VENANGO COUNTY.

May	3-4	President,	250	$1,500	Unknown,	....	....	Wirt.
Oct.	29	Cherrytree,	1	....	P. R. R.,	....	....	Parker.
Nov.	7-9	Canal,	55	245	E. R. R.,	....	$6 00	Mahaffey.
			306	$1,745		....	$6 00	

WARREN COUNTY.

Aug.	2-3	Southwest,	30	....	Clearing (2),	$34 50	$24 00	Allison.
	3	Glade,	1.5	$10	Berry pickers,	2 95	....	Winchester.
	14	Southwest,	78	300	N. Y. C.,	4 00	....	Strite.
	17	Southwest,	5	....	Unknown,	....	....	Gustafson.
	17-28	Southwest,	10	....	N. Y. C. (3),	7 93	4 80	Gustafson.
	17-18	Eldred,	10	....	N. Y. C. (3),	1 62	....	Gustafson.
Nov.	8	Pittsfield,	20	....	Burning brush (4),	6 63	2 10	Johnson.
			154.5	$310		$57 63	$30 90	

WAYNE COUNTY.

April	16	Waymart,	25	$25	Railroad (5),	....	$12 00	Denk.
May	5	Canaan,	50	50	Railroad (?),	$16 18	....	Shorts.
	11-12	Canaan,	100	100	Railroad (?),	9 22	....	Shorts.
	12-13	Palmyra,	50	1,600	Hunters (6),	14 05	....	Schlosser.
Oct.	28-29	Lebanon,	25	....	Hunters,	12 60	....	Gager.

Note (a)—Company responsible paid claim of $10 for damages to State Forest.
Note (b)—Case refused by Attorney General. Person responsible has promised to pay bill.
Note (c)—Claim for damages and cost of extinction not yet settled.
Note (d)—Case refused by Attorney General.
Note (e)—Warden's bill of $11.35 paid by person responsible.
Note (f)—Settlement demanded from person responsible but not yet settled.
Note (1)—See also fire of same date in Snyder county.
Note (2)—Warden's bill of $30.50 paid by drillers responsible.
Note (3)—Warden's bills presented to the railroad company at their request and paid by them.
Note (4)—Warden's bill paid by person responsible.
Note (5)—Bill outlawed because not presented within the sixty day limit.
Note 6)—Settlement demanded of person responsible but not yet finally adjusted.

TABLE I—*Continued.*

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
	WAYNE COUNTY—Continued.						
Nov. 3	Dreher,	1.5	10	Hunters,	....	1 35	Jones.
3	Dreher,	.7	....	Hunters,	1 62	....	Dunning.
8-9	South Canaan,	2	....	Unknown,	4 75	....	Robinson.
9	Dreher,	1	....	Unknown,	4 93	....	Dunning.
Dec. 6-7	Paupack,	700	1,400	Hunters,	52 30	....	Daniels.
		955.2	$2,585		$115 65	$13 35	
	WESTMORELAND COUNTY.						
April 16	Ligonier,	35	$15	P. W. & S.,	$4 30	$1 35	Bearer.
20	Unity,	25	250	Sawmill (a),	8 01	....	Johnston.
May 1-3	Fairfield,	310	355	Lumbering (b),	22 60	....	Frain.
11	Ligonier,	125	253	Incendiary (c),	17 87	....	Darr.
12	Unity,	50	150	Hunters,	3 10	....	Johnston.
12	Donegal,	1	3	Unknown,	1 45	6 00	Knupp.
12-14	Ligonier,	165	333	Incendiary (c),	42 64	3 55	Darr.
13	Ligonier,	10	20	Incendiary (c),	....	....	Darr.
13	Ligonier,	.1	....	Incendiary (c),	....	....	Darr.
13	Ligonier,	5	....	Lumbering (d),	5 78	6 00	Darr.
Oct. 27-28	Cook,	20	150	Hunters,	8 50	1 50	Campbell.
28	Derry,	50	100	Unknown,	9 70	....	Johnson-Schwalm.
28-29	Ligonier,	3	50	Hunters,	7 80	....	Wolford.
28-29	Ligonier,	400	100	Hunters,	32 68	....	Will.
29	Derry,	.2	....	P. R. R.,	85	....	Schwalm.
29	St. Clair,	5	25	Unknown,	9 40	....	Reed.
29	Penn,	4	....	Unknown,	4 15	....	Penman.
29-30	Fairfield,	5	25	Unknown,	13 75	....	Frain.
30	Ligonier,	3	15	Previous, fire,	21 75	....	Darr.
30-31	Ligonier,	2	....	Hunters,	13 17	....	Will.
Nov. 2	Fairfield,	.2	....	Hunters,	3 57	....	Reed.
3-4	Ligonier,	225	300	Incendiary,	29 03	....	Wolford.
9	Fairfield-Derry,	640	150	Unknown,	30 05	....	Frain-Reed.
12	Fairfield,	60	50	Unknown,	8 20	....	Frain.
Dec. 6-7	Penn,	1	2	Unknown,	4 15	2 40	Bearer.
8	Cook,	20	15	Burning brush (e),	14 50	3 00	Knupp.
8	Derry,	4	....	Unknown,	7 00	....	Schwalm.
		2,168.5	$2,361		$324 00	$23 80	

WYOMING COUNTY.

April	19-21	Noxen,	100	....	L. V.,		....	....
Nov.	27	Meshoppen,	2	$50	Unknown,	$19 30	....	Schenck.
Dec.	6-7	Meshoppen,	175	500	L. V.,	....	$0 60	Craige.
	6-7	Falls,	75	....	L. V. (?),	18 35	13 63	Craige.
	6-7	Washington,	90	506	L. V.,	13 90	....	McKune.
	6-8	Forkston,	100	....	Unknown,	11 05	8 40	Carney.
	7	Noxen,	45	....	Unknown,	15 85	....	Lewis.
	7-8	Mehoopany,	100	300	Unknown,	5 65	....	Turner.
	8-9	Braintrim,	15	25	L. V.,	8 35	....	Decker.
						9 70	....	Hoadley.
			702	$1,331		$102 15	$22 65	

YORK COUNTY.

April	18	Fawn,	7	$32	Sawmill,	$12 38	....	Brooks.
	18-19	Hellam,	500	1,200	Sawmill,	....	....	Hoover.
May	4	Lower Chanceford,	40	1,000	M. & P.,	9 30	....	Sinclair.
			547	$2,232		$21 68	....	

Note (a)—Referred to Attorney General. Case pending.
Note (b)—Settlement demanded of persons responsible but not yet finally adjusted.
Note (c)—Referred to Attorney General. Investigation authorized.
Note (d)—Settlement demanded of persons responsible but not yet finally adjusted.
Note (e)—Warden's bill paid by person responsible.

TABLE II. *Summary by Counties of the Cause, Area, Damage, and Cost of Extinction of Forest Fires in 1916.*

County.	Causes.								Total.	Area.	Total damage.	Cost of Extinction.	
	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.				From fire fund.	To individuals.
Adams,	....	....	7	1	....	....	1	....	9	526	$1,606	$107 65	$43 38
Allegheny,	....	....	....	....	....	....	....	....	....	....	....	....	....
Armstrong,	6	....	....	2	....	....	....	2	10	222	917	38 10	24 85
Beaver,	....	....	....	....	....	....	....	....	....	....	....	....	....
Bedford,	3	6	1	9	3	....	1	23	46	4,996	4,703	483 16	79 72
Berks,	10	1	....	3	....	....	....	13	27	2,225	5,112	305 71	4 08
Blair,	5	4	1	7	6	....	3	15	41	17,977	19,743	636 69	102 85
Bradford,	2	....	....	....	....	....	....	1	3	47	32	17 00	2 75
Bucks,	1	....	....	1	....	....	....	2	4	35	74	20 06	....
Butler,	1	....	....	....	....	....	....	....	1	60	....	9 85	....
Cambria,	13	2	....	7	1	1	....	7	31	614	3,233	139 75	30 15
Cameron,	5	2	1	....	1	....	....	6	15	8,207	7,445	196 55	326 62
Carbon,	15	2	2	3	....	....	....	11	33	7,466	10,429	376 73	21 90
Centre,	14	3	....	9	....	....	12	9	47	9,143	8,161	1,556 20	891 15
Chester,	....	....	....	2	....	....	....	3	5	454	4,687	54 02	....
Clarion,	....	....	....	....	....	....	....	2	2	7	26	13 35	90
Clearfield,	3	1	....	4	....	....	1	5	14	3,482	1,071	177 95	10 90
Clinton,	23	....	4	4	3	2	6	14	56	6,701	23,330	529 40	538 15
Columbia,	....	1	....	1	....	....	2	4	8	3,248	17,725	187 88	17 20
Crawford,	2	....	....	....	....	....	....	....	2	752	....	4 75	90
Cumberland,	10	....	....	8	....	....	....	2	20	1,517	2,019	180 01	54 85
Dauphin,	11	....	....	3	1	....	....	5	20	3,604	6,466	307 94	91 80
Delaware,	....	....	....	....	....	....	....	....	....	....	....	....	....
Elk,	6	1	....	6	1	....	....	....	14	1,380	2,792	581 56	29 75
Erie,	....	....	....	....	....	....	....	....	....	....	....	....	....
Fayette,	2	4	6	5	1	....	....	8	26	3,908	7,247	316 10	19 55
Forest,	5	....	....	1	....	....	....	2	8	337	25	23 30	7 95
Franklin,	6	....	41	10	....	....	3	15	75	1,526	2,219	541 90	385 95
Fulton,	....	1	3	4	1	1	1	7	18	1,200	2,362	276 05	36 71

Greene,													
Huntingdon,	6	1	1	10	3		2	12	34	7,610	10,118	963 41	815 57
Indiana,	8			1			1		5	457	8,400	81 70	10 90
Jefferson,				1				1	2	16		6 88	75
Juniata,	1	1	1	6	4	1		2	16	3,692	6,061	206 76	92 52
Lackawanna,	1	2		2				7	12	3,050	3,410	233 68	26 28
Lancaster,	2								2	350	2,525	63 81	
Lawrence,													
Lebanon,	1							1	2	1,100	1,200	55 35	
Lehigh,		2						6	8	443	1,560	75 41	24 75
Luzerne,	14		1	10	1		1	22	49	15,859	15,172	1,020 67	32 90
Lycoming,	5	1	9	3	2	1		6	27	5,009	10,520	439 16	126 71
McKean,		2			1			3	6	625	406	58 41	14 78
Mercer,								1	1	6			8 50
Mifflin,	6		3	3	1		1	4	18	2,472	4,294	356 61	118 88
Monroe,	22	1		5	1		2	11	42	1,128	1,394	174 95	89 01
Montgomery,	1			1					2	11			
Montour,													
Northampton,			1						1	1		2 80	
Northumberland,	6	1		1				5	13	656	578	79 55	53 90
Perry,	2			4		1	1	7	15	290	1,238	136 84	9 80
Philadelphia,													
Pike,	1			9				6	16	2,871	4,459	218 52	30 65
Potter,	5	8	1	5	1	1	1	8	30	13,385	10,843	645 69	643 37
Schuylkill,	12			5	1		4	15	37	3,092	8,491	394 31	39 30
Snyder,	1		2	3	1			2	9	2,205	1,455	238 22	59 96
Somerset,	2	1	1	5	4		1	11	25	1,940	4,533	197 58	22 45
Sullivan,	14		2	3				4	23	542	286	180 36	35 35
Susquehanna,	1								1	25		2 95	
Tioga,	3	3	1	1	1	1		4	14	2,547	903	203 61	46 88
Union,	2		1	3	1	1		1	9	903	1,408	173 81	39 15
Venango,	2							1	3	306	1,745		6 00
Warren,	3	2		1				1	7	155	310	57 63	30 90
Washington,													
Wayne,	3	1		4				2	10	955	2,585	116 65	13 35
Westmoreland,	2	1	5	6	3		1	9	27	2,169	2,361	324 00	23 80
Wyoming,	5							4	9	702	1,381	102 15	22 65
York,	1				2				3	547	2,232	21 68	
Total,	270	55	95	182	44	10	45	312	1,013	154,752	$2[illegible]6,292	$13,913 80	$4,661 11

TABLE III. *Summary By Months.*

County.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Adams,				3	5					1	1		9
Allegheny,													
Armstrong,					3					5	2		10
Beaver,													
Bedford,				7	9	2				5	18	5	46
Berks,	2			7	10					1	5	2	27
Blair,				5	9					12	6	9	41
Bradford,								1			1	1	3
Bucks,				2						1		1	4
Butler,										1			1
Cambria,				1	15		1			3	7	4	31
Cameron,	1			6	6			1		1			15
Carbon,				9	11			1	1	2	5	4	33
Centre,				8	20				1	8	6	4	47
Chester,				1		1				1	2		5
Clarion,											2		2
Clearfield,				1	10						1	2	14
Clinton,	1		1	15	16			4	2	6	6	5	56
Columbia,					3				1	2	2		8
Crawford,								1		1			2
Cumberland,			1	5	4	1	1			1	5	2	20
Dauphin,				8	6					3	3		20
Delaware,													
Elk,				1	3			1		5	3	1	14
Erie,													
Fayette,				4	5					6	11		26
Forest,								1	1	6			8
Franklin,			5	14	28					2	19	7	75
Fulton,				4	2						11	1	18
Greene,													
Huntingdon,				6	8						15	5	34
Indiana,					1					1	2	1	5
Jefferson,										1	1		2
Juniata,			2	2	3				1	2	5	1	16
Lackawanna,				4	5			1		1		1	12

Lancaster,	....	....	....	2	....	....	....	....	....	....	....	....	2
Lawrence,	....	....	....	....	....	....	....	....	....	....	....	....	....
Lebanon,	....	....	....	2	....	....	....	....	....	....	....	....	2
Lehigh,	....	....	....	1	5	....	....	....	....	1	....	1	8
Luzerne,	....	....	....	7	17	....	....	....	5	7	7	6	49
Lycoming,	....	....	....	1	8	....	....	1	1	3	3	10	27
McKean,	....	....	....	....	3	....	....	....	....	1	1	1	6
Mercer,	....	....	....	....	....	....	....	....	....	....	1	....	1
Mifflin,	....	....	....	4	5	....	....	....	2	2	4	1	18
Monroe,	....	....	....	9	10	....	....	1	1	8	10	3	42
Montgomery,	....	....	....	....	....	....	....	....	....	....	2	....	2
Montour,	....	....	....	....	....	....	....	....	....	....	....	....	....
Northampton,	....	....	....	....	....	....	....	....	....	....	....	1	1
Northumberland,	....	....	....	3	2	....	....	....	....	1	3	4	13
Perry,	....	....	....	4	4	....	....	1	....	....	6	....	15
Philadelphia,	....	....	....	....	....	....	....	....	....	....	....	....	....
Pike,	....	....	....	3	3	....	....	....	....	1	3	6	16
Potter,	....	....	....	3	22	....	....	....	1	3	1	....	30
Schuylkill,	....	....	....	9	9	....	....	....	1	2	9	7	37
Snyder,	....	....	....	2	2	....	....	1	....	1	2	1	9
Somerset,	....	....	....	1	4	1	....	....	....	4	13	2	25
Sullivan,	....	....	....	8	8	....	....	....	1	2	2	2	23
Susquehanna,	....	....	....	....	....	....	....	....	....	....	....	1	1
Tioga,	....	....	....	2	7	....	....	2	1	....	1	1	14
Union,	....	....	....	2	3	....	....	....	....	1	2	1	9
Venango,	....	....	....	....	1	....	....	....	....	1	1	....	3
Warren,	....	....	....	....	....	....	....	6	....	....	1	....	7
Washington,	....	....	....	....	....	....	....	....	....	....	....	....	....
Wayne,	....	....	....	1	3	....	....	....	....	1	4	1	10
Westmoreland,	....	....	....	2	8	....	....	....	....	10	4	3	27
Wyoming,	....	....	....	1	....	....	....	....	....	....	1	7	9
York,	....	....	....	2	1	....	....	....	....	....	....	....	3
Total,	4	....	9	181	307	5	2	23	20	127	220	115	1,013

TABLE IV. *Classification of Fires By Acreage.*

County.	Less than 1 acre.		1 to 100 acres.		100 to 1000 acres.		More than 1,000 acres.		Total	
	Number.	Area.	Number.	Area.	Number.	Area.	Number.	Area.	Number.	Area.
Adams,	2	1	6	212	1	313	......	......	9	526
Allegheny,	......	......	......	......	......	......	......	......	......	......
Armstrong,	1	.2	9	222	......	......	......	......	10	222.2
Beaver,	......	......	......	......	......	......	......	......	......	......
Bedford,	......	......	30	896	16	4,100	......	......	46	4,996
Berks,	3	.4	20	225	4	2,000	......	......	27	2,225.4
Blair,	1	.?	24	677	13	4,300	3	13,000	41	17,977
Bradford,	......	......	3	47	......	......	......	......	3	47
Bucks,	......	......	4	35	......	......	......	......	4	35
Butler,	......	......	1	60	......	......	......	......	1	60
Cambria,	6	1.2	23	213	2	400	......	......	31	614.2
Cameron,	2	.?	9	272	3	935	1	7,000	15	8,207
Carbon,	3	.9	21	448	7	2,017	2	5,000	33	7,465.9
Centre,	1	.2	29	821	15	3,372	2	4,950	47	9,143.2
Chester,	......	......	4	54	1	400	......	......	5	454
Clarion,	......	......	2	7	......	......	......	......	2	7
Clearfield,	2	.8	10	181	1	300	1	3,000	14	3,481.8
Clinton,	4	.8	33	935	18	4,765	1	1,000	56	6,700.8
Columbia,	......	......	5	48	1	100	2	3,100	8	3,248
Crawford,	......	......	1	2	1	750	......	......	2	752
Cumberland,	4	1	13	259	3	1,257	......	......	20	1,517
Dauphin,	......	......	8	234	12	3,370	......	......	20	3,604
Delaware,	......	......	......	......	......	......	......	......	......	......
Elk,	3	1.1	8	79	3	1,300	......	......	14	1,380.1
Erie,	......	......	......	......	......	......	......	......	......	......
Fayette,	1	.5	14	453	11	3,454	......	......	26	3,907.5
Forest,	1	.?	6	97	1	240	......	......	8	337
Franklin,	14	.7	56	725	5	800	......	......	75	1,525.7
Fulton,	1	.?	13	150	4	1,050	......	......	18	1,200
Greene,	......	......	......	......	......	......	......	......	......	......
Huntingdon,	4	1.3	24	589	4	650	2	6,370	34	7,610.3
Indiana,	......	......	4	67	1	390	......	......	5	457
Jefferson,	......	......	2	16	......	......	......	......	2	16
Juniata,	2	.2	9	167	3	650	2	2,875	16	3,692.2
Lackawanna,	......	......	5	340	7	2,710	......	......	12	3,050
Lancaster,	......	......	1	50	1	300	......	......	2	350
Lawrence,	......	......	......	......	......	......	......	......	......	......
Lebanon,	......	......	......	......	2	1,100	......	......	2	1,100
Lehigh,	......	......	6	188	2	255	......	......	8	443
Luzerne,	2	1	32	673	12	2,785	3	12,400	49	15,859
Lycoming,	4	.9	15	174	6	1,714	2	3,120	27	5,008.9
McKean,	......	......	4	75	2	550	......	......	6	625
Mercer,	......	......	1	6	......	......	......	......	1	6
Mifflin,	6	1	8	146	3	450	1	1,875	18	2,472
Monroe,	12	4.2	26	449	4	675	......	......	42	1,128.2
Montgomery,	......	......	2	11	......	......	......	......	2	11
Montour,	......	......	......	......	......	......	......	......	......	......
Northampton,	1	.4	......	......	......	......	......	......	1	.4
Northumberland,	1	.5	10	145	2	510	......	......	13	655.5
Perry,	3	1	12	289	......	......	......	......	15	290
Philadelphia,	......	......	......	......	......	......	......	......	......	......
Pike,	......	......	10	321	5	1,050	1	1,500	16	2,871
Potter,	5	1.1	16	429	7	1,555	2	11,400	30	13,385.1
Schuylkill,	1	.2	29	342	7	2,750	......	......	37	3,092.2
Snyder,	1	.2	4	55	3	950	1	1,200	9	2,205.2
Somerset,	3	1	16	539	6	1,400	......	......	25	1,940
Sullivan,	3	1	18	341	2	200	......	......	23	542
Susquehanna,	......	......	1	25	......	......	......	......	1	25
Tioga,	1	.1	9	236	2	211	2	2,100	14	2,547.1
Union,	1	.5	5	102	3	800	......	......	9	902.5
Venango,	......	......	2	56	1	250	......	......	3	306
Warren,	......	......	7	155	......	......	......	......	7	155
Washington,	......	......	......	......	......	......	......	......	......	......
Wayne,	1	.7	7	154	2	800	......	......	10	954.7
Westmoreland,	3	.5	18	503	6	1,665	......	......	27	2,168.5
Wyoming,	......	......	5	227	4	475	......	......	9	703
York,	......	......	2	47	1	500	......	......	3	547
Total,	103	24.6	662	14,269	220	60,568	28	79,890	1,013	154,751.6

TABLE V. *Summary of 1916 Fires By Causes. (Approximated).*

Cause.	Number of Fires.	Area Burned.	Damage.	Cost of Extinction.
Railroads,	270	27,840	$44,300	$1,820
Brush burning,	55	8,400	11,235	890
Incendiary,	95	40,200	61,200	1,650
Campers,	182	21,000	28,350	3,410
Lumbering,	44	7,400	8,600	610
Lightning,	10	10	15	40
Miscellaneous,	45	3,300	7,700	380
Unknown,	312	46,600	84,900	5,100
Total,	1,013	154,750	$236,300	$13,900

TABLE VI. *Forest Fire Patrol Service During 1916.*

	Number of Men.						Salaries Paid.	
	April.	May.	September.	October.	November.	December.	Associations.	State.
Cambria,	......	......	......	......	1	......	....	$25 00
Centre,	1	2	2	4	6	......	$56 38	126 37
Clinton,	......	......	......	2	2	......	....	125 00
Huntingdon,	......	......	2	2	3	3	....	243 87
Juniata,	......	......	......	......	1	1	....	44 04
Lycoming,	......	......	1	1	1	1	....	158 22
Mifflin,	......	......	1	1	1	1	....	120 00
Monroe,	6	6	4	5	7	......	545 01	544 99
Potter,	......	......	1	1	1	......	....	120 00
Tioga,	......	......	......	2	2	......	....	86 48
Westmoreland,	......	......	......	......	1	......	....	15 75
Total,	7	8	11	18	26	6	$601 39	$1,609 72

TABLE VII. *Comparison By Number, Area, Damage, and Cost of Extinction—1915 and 1916 Forest Fires.*

County.	Number.		Area.		Damage.		Cost of Extinction.	
	1915.	1916.	1915.	1916.	1915.	1916.	1915.	1916.
Adams,	4	9	1,540	526	$5,985	$1,606	$76 22	$107 65
Allegheny,	....	....	....	....	....	....	....	....
Armstrong,	9	10	[illegible]	222	2,[illegible]	917	82 50	38 10
Beaver,	....	....	....	....	....	....	....	....
Bedford,	39	46	6,449	4,996	11,049	4,703	969 49	483 16
Berks,	18	27	3,255	2,225	24,850	6,112	497 81	306 71
Blair,	18	41	3,353	17,977	6,088	19,743	317 82	636 69
Bradford,	7	3	958	47	2,227	32	64 10	17 00
Bucks,	2	4	65	35	650	74	5 75	20 05
Butler,	....	1	....	60	....	....	....	9 85
Cambria,	17	31	2,253	614	2,313	3,233	351 83	139 75
Cameron,	21	15	4,169	8,207	6,265	7,445	327 87	196 55
Carbon,	38	33	6,696	7,466	42,007	10,429	628 03	376 73
Centre,	85	47	28,120	9,143	52,527	8,161	2,288 90	1,556 20
Chester,	2	5	8	454	163	4,687	43 43	54 02
Clarion,	9	2	727	7	774	26	279 90	13 35
Clearfield,	57	11	14,7[illegible]	3,48[illegible]	19,724	1,071	1,477 65	177 95
Clinton,	59	56	70,064	6,701	93,047	23,330	2,247 63	529 40
Columbia,	8	8	3,433	3,218	12,885	17,725	248 55	187 88
Crawford,	....	2	....	752	....	....	....	4 75

TABLE VII—*Continued.*

County.	Number.		Area.		Damage.		Cost of Extinction.	
	1915.	1916.	1915.	1916.	1915.	1916.	1915.	1916.
Cumberland,	23	20	19,046	1,517	117,575	2,019	811 46	180 01
Dauphin,	57	20	13,516	3,604	25,045	6,466	1,127 28	307 94
Delaware,	....	....	....	....	....	....	....	....
Elk,	14	14	4,223	1,380	6,065	2,792	872 46	581 56
Erie,	....	....	....	....	....	....	....	....
Fayette,	17	26	2,334	3,908	3,423	7,247	207 06	316 10
Forest,	1	8	2,266	337	....	25	77 65	23 30
Franklin,	65	75	6,257	1,526	7,875	2,219	1,045 13	541 90
Fulton,	8	18	4,682	1,200	6,466	2,362	312 88	276 05
Greene,	....	....	....	....	....	....	....	....
Huntingdon,	35	34	10,767	7,610	36,088	10,118	812 15	963 41
Indiana,	1	5	136	457	304	3,400	29 95	81 70
Jefferson,	19	2	941	16	3,514	....	211 90	6 88
Juniata,	6	16	403	3,692	690	6,061	120 51	206 76
Lackawanna,	16	12	1,218	3,050	1,263	3,410	139 20	233 68
Lancaster,	6	2	2,257	350	7,010	2,525	193 68	63 81
Lawrence,	2	....	10	....	207	....	13 05	....
Lebanon,	9	2	6,559	1,100	8,819	1,200	548 45	55 35
Lehigh,	12	8	5,853	443	35,567	1,560	343 47	75 41
Luzerne,	54	49	7,437	15,859	16,327	15,172	1,006 10	1,020 67
Lycoming,	36	27	9,007	5,009	6,806	10,520	1,104 13	439 16
McKean,	5	6	20	625	50	406	14 75	58 41
Mercer,	....	1	....	6	....	....	....	....
Mifflin,	17	18	4,105	2,472	8,538	4,294	968 85	356 61
Monroe,	40	42	12,505	1,128	18,171	1,394	1,283 10	174 95
Montgomery,	....	2	....	11	....	....	....	....
Montour,	1	....	12	....	210	....	9 70	....
Northampton,	8	1	1,093	1	2,735	....	180 28	2 80
Northumberland,	9	13	4,618	656	12,265	578	244 20	79 55
Perry,	29	15	4,874	290	6,461	1,238	951 40	136 84
Philadelphia,	....	....	....	....	....	....	....	....
Pike,	31	16	23,049	2,871	30,038	4,459	928 86	218 52
Potter,	28	30	4,845	13,385	15,058	10,843	524 25	645 69
Schuylkill,	27	37	14,379	3,092	131,223	8,491	992 25	394 31
Snyder,	5	9	3,905	2,306	16,125	1,455	751 10	238 22
Somerset,	20	25	2,484	1,940	10,987	4,533	200 04	197 58
Sullivan,	8	23	301	542	....	286	69 90	180 36
Susquehanna,	4	1	570	25	3,170	....	44 65	2 95
Tioga,	15	14	3,210	2,547	9,455	903	128 04	203 61
Union,	11	9	937	902	1,843	1,408	143 82	173 81
Venango,	2	3	225	306	850	1,745	23 50	....
Warren,	3	7	1,095	155	1,030	310	126 75	57 63
Washington,	....	....	....	....	....	....	....	....
Wayne,	12	10	2,570	955	7,175	2,585	597 45	115 65
Westmoreland,	25	27	4,128	2,169	2,350	2,361	421 91	324 00
Wyoming,	14	9	4,468	702	4,933	1,381	499 25	102 15
York,	13	3	206	547	1,582	2,232	89 55	21 68
Total,	1,101	1,013	336,635	154,752	$850,777	$236,292	$28,078 16	$13,913 80

TABLE VIII. *Comparison By Months—1915 and 1916 Forest Fires.*

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1915,	....	3	84	739	94	18	1	....	....	34	119	9	1,101
1916,	4	....	9	181	307	5	2	23	20	127	220	115	1,013

TABLE IX. *Comparison By Acreage—1915 and 1916 Forest Fires.*

Year.	Less than 1 acre.		1 to 100 acres.		100 to 1,000 acres.		More than 1,000 acres.		Total.	
	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.
1915,	61	31	639	20,637	323	115,116	78	200,851	1,101	336,635
1916,	103	25	662	14,260	220	60,568	28	79,890	1,013	154,752

TABLE X. *Comparison By Causes—1915 and 1916 Forest Fires.*

Year.	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.	Total.
1915,	274	105	120	136	28	19	37	382	1,101
1916,	270	55	95	182	44	10	45	312	1,013

TABLE XI. *STATE FOREST LAND BURNED—1915 and 1916.*

County.	Total State land June 1, 1916.	Area Burned.	
		1915.	1916.
Adams,	20,886	1,540	134
Bedford,	10,018	125	160
Cameron,	81,194	1,410	6,085
Centre,	78,445	2,408	5,134.2
Clearfield,	47,506	25	3.2
Clinton,	129,090	13,275	472.5
Cumberland,	20,450	5,550	892.5
Dauphin,	3,354	2,000	....
Elk,	14,840	135	100
Franklin,	33,910	502	604.6
Fulton,	6,300	....	....
Huntingdon,	57,285	17	5,473.3
Juniata,	3,178	....	327.7
Lackawanna,	4,956	....	800
Lycoming,	88,927	2,704	1,780.1
Mifflin,	49,526	137	1,597.1
Monroe,	6,401	....	....
Perry,	26,471	2,150	....
Pike,	57,254	6,155	394
Potter,	129,607	365	180.8
Snyder,	19,086	2,825	1,615
Somerset,	3,467	78	....
Tioga,	57,406	105	1,178
Union,	53,675	387	786
Westmoreland,	5,065	70	....
Wyoming,	1,177	....	....
	1,009,474	41.963	27,718

Commonwealth of Pennsylvania

DEPARTMENT OF FORESTRY

Bulletin No. 17

REPORT

OF THE

Chief Forest Fire Warden

FOR

THE YEAR 1917

Issued by Direction of the Commissioner of Forestry

HARRISBURG, PA.:
J. L. L. KUHN, PRINTER TO THE COMMONWEALTH.
1918.

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PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN,
Commissioner of Forestry

IRVIN C. WILLIAMS,
Deputy Commissioner of Forestry

BUREAU OF FOREST PROTECTION

GEORGE H. WIRT,
Chief Forest Fire Warden

HOWARD W. SIGGINS,
Clerk

LETTER OF TRANSMITTAL

Hon. Robert S. Conklin,
Commissioner of Forestry.

Dear Sir:

There is presented herewith the third annual report of the Chief Forest Fire Warden, setting forth the work of the Bureau of Forest Protection for the calendar year ending December 31, 1917. Your attention is called respectfully to the fact that this year has had unusual fire seasons but nevertheless the wardens have kept the average acreage per fire close to that of 1916. Attention is also directed to the number of instances in which legal action was requested, and those in which action was taken, and settlement made; to the list of cases in which the State has been saved expense for extinction, and of those in which the State has been reimbursed for the cost of extinction. The activities of the year have been successful because of the enthusiasm and loyalty of the wardens. It is necessary to maintain this spirit by still closer organization. Education, organization, and co-operation must be our constant aim.

Yours respectfully,

GEORGE H. WIRT,
Chief Forest Fire Warden.

Harrisburg, February 28, 1918.

ONLY 66 FIRES OF THE 2,087 REPORTED BURNED MORE THAN 1,000 ACRES EACH, BUT THEY BURNED MORE THAN 44% OF ALL THE AREA BURNED OVER.

FIVE HUNDRED AND EIGHTY SEVEN FIRES BURNED MORE THAN 100 ACRES EACH AND THESE FIRES WERE RESPONSIBLE FOR OVER 91% OF THE AREA BURNED.

LARGE FIRES ARE THE RESULT OF SMALL FIRES UNEXTINGUISHED

INTRODUCTORY

Forest protection has been, is now, and always will be the keystone of forest conservation. From Canada comes the statement: "Conservation and good forest management are meaningless terms as long as the plague of flames sweeps off in a week more than the constructive forester can accomplish in ten years. Until fire is eliminated conservation of forests can make no real headway."

In 1918 it will be a difficult task for our Department to get 6,000,000 seedlings planted upon private and State land. If they are all planted it will mean the reforestation of only 4,000 acres at best. At this rate of planting, in order to repair the loss of one week's fires in May of 1917, it would take over 40 years.

Fires strike at the root of the forest and destroy the factors which make it of most value to man. If forests are to be grown, undoubtedly fires must be prevented; and it is not enough to prevent them or to keep them under control for one year or a short period of years. It is a long time between the seedling stage of a tree and the harvesting stage. The protection work must be complete and continuously in effect in order that forests once started, may reach maturity.

That fire can be kept from forests is not disputed. In Europe, before the war, fire was considered as the least important of all the dangers to which forests were exposed. Fires can be kept from Pennsylvania forests also, but it will take time, work, and money. There must be *education, organization,* and *co-operation.*

There is no better time than the present for our people to consider the protection of forests from fire. The prosecution of the war has made necessary the marshalling of every resource in order to equip and maintain our army, our navy, our commerce, the existence of our Allies, and very probably, our own existence. It has been discovered that in war as well as in peace, wood plays a most important part. It is now the common thing for the Allied Governments to call upon their people to "save and give," to practice "thrift" in every line of activity. It is not a good indication of thrift in Pennsylvania as long as it is possible for 320,000 acres to burn over in one year, as occurred in 1917, or 168,000 acres in one week in May of the same year.

Wood in various forms is needed at every turn and the tremendous demand upon our forest will continue for some time to come. The forests can meet the demand if properly cared for, but they cannot if they are to be continually subject to damage from fire. Forest fires must no longer be regarded as inevitable, unpreventable, and as accidents. They must be considered in their true light, namely that they are a curse which must be done away with, and the person or corporation who does not use every possible means to prevent damage while using fire must suffer because of the abuse of his liberty and of his neighbors rights.

FIRE WARDEN ORGANIZATION

On January 1, 1917, there were 1,784 names upon our list of wardens, but there were still a number who were unenthusiastic and practically inactive. In order to correct this condition and in order to save some future expense, it was decided to ask each warden to subscribe to an oath of office which reads as follows:

PENNSYLVANIA DEPARTMENT OF FORESTRY

Bureau of Forest Protection

Form 75.

STATE OF PENNSYLVANIA }
COUNTY OF ....} ss:

(affirm)
I, ..., do solemnly (swear) that I will support, obey and defend the Constitution of the United States and the Constitution of this Commonwealth; that I will discharge the duties of Forest Fire Warden for the Department of Forestry of this Commonwealth with fidelity, and that I will execute the orders and directions of the Commissioner of Forestry promptly and to the best of my ability; that I will not receive directly or indirectly any money or other valuable thing for the performance or non-performance of any act or duty pertaining to my office other than the compensation allowed by the Department of Forestry; that I will keep careful and accurate records of the work performed by me in the manner specified and required by the Department of Forestry; that I will render to the Department of Forestry a true and correct account of time and cash expenditures within sixty days of such expenditures; that time so expended and time so charged shall have been necessarily incurred in the performance of my official duties; and that upon severing my connection with the Department of Forestry I will surrender the badge, the certificate of appointment, and all other property belonging to the Department of Forestry, then in my possession.

....
Forest Fire Warden.

Sworn and subscribed before me this................
day of..191....
....

My Commission expires..........................

A number of men were not willing to furnish such an oath and they were dropped from our rolls. To each warden who has filled up our reference card (Form 2) and subscribed to the oath of office, a certificate of appointment and a badge have been issued. On August 1st, the active men numbered 1,360 and at that time the names of all others were dropped. On December 31st, there were 1,463 men, including State Foresters, Forest Rangers, and Game Protectors. Conditions are such that we shall never have a force that is not constantly changing but a large proportion of the wardens now listed may be expected to render service for more than a few years.

There are still some parts of the state that are not properly protected by wardens. Men can not be persuaded to take up the work, or the enthusiasm of those already appointed is not kept up. It is absolutely necessary to keep in touch with the wardens and there is nothing that counts for so much as personal contact. In the counties where our foresters can find time to visit the wardens under their supervision two or three times a year to talk over the work, to offer suggestions, and help to answer perplexing questions, and to give encouragement, fire prevention is on the increase. The time and money spent by our foresters in this work is yielding big returns and some way must be found to maintain this part of our organization. The portion of territory covered by foresters who have gone to war, by all means ought not to be allowed to get into former conditions, but should be improved if possible by extending the limits of supervision for the foresters remaining.

Unfortunately the meager appropriation of the last Legislature makes it practically impossible to arrange for district fire wardens as provided for in the law and as requested in our budget. The loss of our foresters is another handicap, but the problem might be solved by a rearrangement of the foresters still available.

During November, at the request of the Secretary of the Game Commission, Game Protectors were made forest fire wardens, with instructions to report all forest fire data either to the Chief Forest Fire Warden or to a designated forester.

ENLISTMENTS

Foresters:

W. Gard Conklin,
Horace F. Critchley,
J. R. Hogentogler,
W. H. Horning,
Walter Leach,
B. D. McPherson,
Charles R. Meek,
J. D. Middour,
W. E. Montgomery,
J. Newton Morton,
Harold F. Post,
H. B. Rowland.
George W. Sheeler,
Ira L. Shenefelt,
H. W. Siggins,
Edgar H. Smith,
E. S. Smith,
H. A. Smith,
R. W. Stadden,
H. C. Van Horn,
Arthur B. Wells,
E. A. Ziegler.

Forest Rangers:

Harry L. Thomas, Mont Alto State Forest.

Local Forest Fire Wardens:

August Larson, Okome, Lycoming County.
Ernest Shaffer, Dauphin, Dauphin County.
R. V. Sharp, Barree, Huntingdon County.
H. C. Wiener, Wilkes-Barre, Luzerne County.

FOREST FIRE WARDEN MEETINGS

On account of the small amount remaining in our appropriation at the beginning of the year it was thought advisable to arrange for no more meetings of the forest fire wardens than were specifically requested by foresters. The value of such meetings is not questioned and it is unfortunate that funds are not available so that meetings could be held in each county at least every second or third year.

On February 28th a meeting of the Lycoming county wardens was held in the court house at Williamsport. There were present 57 wardens including several foresters and rangers. In addition to addresses by several foresters and a general discussion of local questions by the wardens, the meeting was addressed by John E. Person of the Williamsport Sun. He impressed upon the wardens the fact that they are in a work which is under the direction of an important Department of the State government, a work which aims to prevent a tremendous loss and a work which affects everyone in the community. Therefore, everything they do is of interest to the community and should be reported to the newspapers. He pledged the support of the local papers in a fire prevention campaign and urged the men to contribute items of interest frequently.

W. H. Spencer, Esq., also spoke to the men about the general attitude of the people towards forest fires and urged them to do more to educate their people. After the meeting in the court house the wardens were shown the "Curse of the Forest" at the Lyric Theatre.

On March 9th, nine wardens who report to the forester at Pine Grove Furnace, Cumberland county, met at the U. S. Hotel, Mt. Holly. A very informal meeting was held, each one asking questions and telling of his experiences.

On March 10th the 18 wardens reporting to the foresters at Mont Alto and Graeffenburg met in the forester's office at Graeffenburg. Local problems were discussed including the detection of fires from towers, because several towers are being used to good advantage in the territory. It was a great pleasure for those present to have Miss Mira L. Dock who is in close touch with the work of Women's clubs all over the United States, and who was a former member of the State Forestry Reservation Commission, tell of the work the women in various states are doing for forest protection.

On March 20th nine of the Fayette county wardens met in the Municipal Building at Uniontown. On March 22d, 19 of the Westmoreland county wardens met in the high school auditorium at Ligonier. On March 23d, 18 of the Somerset county wardens met in the court house at Somerset. The wardens of these three counties are under the supervision of forester V. M. Bearer. The men entered freely into the discussion of local problems and all indicated a splendid spirit of service.

On March 27th, 36 of the wardens of Monroe county and of some of the townships adjoining that county met at the Fulmer House, Stroudsburg, as guests of the Pocono Protective Fire Association. Addresses were given by some of the officers of the Association, by the District Forester, John L. Strobeck, and by several of the wardens. These wardens have been meeting together annually for several years.

are now well acquainted with each other, and a better co-operation throughout the year has resulted. In the evening the "Curse of the Forest" was shown in the Stroud Theatre for the benefit of the wardens and the general public. Dr. E. L. Kemp, Principal of the Stroudsburg State Normal School spoke about "Forest Conservation." The Chief Forest Fire Warden spoke about "Forest Protection and Its Importance in Monroe County." Unfortunately a steady rain during the day and evening kept people away from the meeting. The Chief Forest Fire Warden was present at all these meetings and reports favorably as to the personnel of the various county organizations and of the success of the meetings.

FOREST FIRE CREWS

The unsettled labor conditions and the low rate of wage (15 cents per hour) paid by the State for fire extinction have been giving the wardens considerable trouble. Some good wardens resigned at the beginning of the year on account of it. The rate of wage was not changed, however, until October 1st, just previous to the fall fire season. Then it was advanced to 20 cents per hour. In some parts of Pennsylvania it is still far below the local average rate of wage for common labor. Some of this difficulty has been solved by the organization of forest fire crews. A few wardens have had certain men in their communities organize for immediate help in case of fire. The results have been worth while and each warden has been urged to organize one or several crews in his neighborhood. Many of them have done so this year. We are endeavoring to establish a force against forest fires that shall be organized down to the last detail and ready for every emergency.

Another difficulty in this connection is the length of time elapsing between date of service and date of payment of men for their services. A part of this trouble can be saved by the fire wardens themselves by a more prompt forwarding of bills. But the longest hold-up is between the time a requisition goes to the Auditor General and the time checks for fire wardens are received from the State Treasurer. It is essential that prompt payments be made to fire fighters. Some means should be devised whereby checks can be forwarded to fire wardens as soon as their bills are received and approved.

EMPLOYEE'S COMPENSATION

During the year two men were injured while extinguishing forest fire and claims for compensation have been presented.

On May 18th, Daniel P. Carsnitz, Powl's Valley, Dauphin County, fell and broke a bone in his wrist. Information was furnished the Workmen's Compensation Board. After several months, inquiry was made as to why no compensation had been forthcoming. It was learned that the Legislature had made no provision for insuring

State employees. The Compensation Board has determined that Mr. Carsnitz is entitled to $17.50, and the cost of medical service which was $10.00.

On November 10th, Colfax Eller of Hopewell, Bedford county, was struck in an eye, as a result of which the eye has been almost or entirely blinded. Mr. Eller is entitled to compensation and reimbursement for medical services but he will have to wait for action by the next Legislature.

PATROL SERVICE

More efficient patrol service has been provided this year than ever before. The patrolmen did a great variety of preventive work and stopped a great many fires before they reached large size. Unfortunately we have not had uniform reports from patrolmen and it is next to impossible to tabulate their work. This defect has now been provided for and after this we shall know just what work has been done and what results have been obtained by patrolmen.

Patrol service must be increased as rapidly as possible in territory where it is found that the fire risk is great. Needless to state, it is unwise to employ patrolmen promiscuously or without reason. When we are sure that conditions warrant the employment of a man, he should be obtained and expected to produce results. This again brings to light the fact that a satisfactory protective organization must be determined according to a knowledge of existing conditions. It is imperative that an early survey of fire hazards be made.

Our law at present limits the salary of a patrolman to $50.00 per month. Under existing conditions this places us under an unsatisfactory handicap in employing good men, and the limitation should be removed.

The following extract from a forester's letter is of value:

"There is a certain amount of fire prevention work that can be done every fire season by the wardens if they are allowed the time to do it. After this is done, they are of no further use in that locality. If we wish to pay them, for scouting around in the forest after they have tried to look after the probable fire dangers, they will do so but are we justified in doing it? There is a very great deal that can be done if we want the wardens to do work on private land so that the land owner need not do it, but our object is to have the land owner do this work. There are times when it would pay to watch certain areas and certain people, and we must do so when it is possible, but unless we have the money to look after that kind of work and are able to follow up every case, it is a waste of time to plan for it.

"Patrol work is the most effective forest fire preventive measure we have at our command. We must have our men meet the people to bring about a change in their viewpoint regarding forest protection. So much of our well meant newspaper work and other literature of free distribution, fails to do the good intended because it does not reach and is not understood by the people who need the enlightenment in its simplest forms. To reach, convert, and to hold the people, we must use a follow-up method; a method that will enlighten, point out, and convince. The only method to fulfill that requirement is the active work of the warden missionary. He must be respected or feared, have a pleasing personality, and be tactful enough to convince his neighbors of the justice and principles of forest protection. He must also understand the people and the work; must know the mountains and take pride in protecting them. Of most importance, he must be a hard working and respectable citizen. Send such a man out to do missionary patrol work in his locality, from time to time, and I assure you, you have found the secret of fire prevention. We must get away from the idea that police power can be respected and obeyed by simply announcing it on paper. The proper function of police power (law) is to educate. To do that function properly, we must dress it in a suit of clothes and send it on a missionary journey of helpfulness and understanding.

"The patrolling was done for the purpose of preventing forest fires. The wardens were instructed to get acquainted with the people and their desires, to locate prospective brushburning operations, to visit saw-mills and lumbering operations, to visit hunters and their camps, to look after traction engines, fishermen and campers. They were instructed to engage men tentatively for fire fighting and to suggest that land owners brush out and open up old roads and paths on their mountain land. They posted notices in localities frequented by tourists and hunters. They visited the schools and distributed literature to the school children. They were requested to ask the people for suggestions and made a careful note of them. The wardens were given permission to do this patrolling when they felt that it was necessary. Whenever they felt that their presence at a certain place or in a certain locality would possibly prevent a fire they dropped their work and went. When a saw-millman did not use a spark arrester he was asked to do so; the same was done when a traction engine was used on the highways. Brush-burners were advised regarding the burning of brush; hunters and fishermen were asked to guard against starting a fire in the forest. If there was a trout stream in the locality, the warden was at it with his suggestions of carefulness and the fire posters. The wardens were given plenty of leeway and were made to feel that they were responsible for the fires occurring in their locality and it was up to them to use their fore-thought and abilities to prevent them. The manner in which they took hold of the work deserves the greatest commendation. A daily report setting forth their activities was required. The daily report of the warden reflects the ability of the man. A few of the wardens did not understand how to make up their report and are thus not credited with the good work they did. I wish to give you a few of the daily reports just as they were made out by the wardens on the monthly report blanks furnished them:

"2 hrs; visited hunters camp in the eve and had a talk with them.
"5 hrs; hunters were numerous today so spent time in the woods near them.
"1½ hrs; put up tourist placard at S. E. Martin's gas tank where same is on sale. From there put up a tourist placard on the Town flagpole at the cross-roads; from there to the mountain land of S. H. Dougherty, where his son has a shingle mill, not in operation, neither does it have a spark arrester on it—however, I don't think his father would allow him to operate it without one.
"3 hrs; saw road man employed by the turnpike company burning leaves along the road without proper protection. Made him stop burning.
"5 hrs; visited two saw-mills and found screens in use, also observed that the horizontal screen is a good one.
"8 hrs; patrol work, found hunters near Keefers Gap recklessly using matches and throwing them in the leaves; charged them and guarded them during the day.
"3 hrs; looking after boys playing in the woods at Burnt Cabins.
"4 hrs; scouting on Little Mountain and getting in touch with squirrel hunters.
"4 hrs; visiting two camps of hunters who were from the cities.
"6 hrs; getting in touch with hunters; found an old tree burning and cut it down.
"4 hrs; patrolling and posting notices along the Maryland State line.
"4 hrs; trailing boy squirrel hunters near New Grenada after telling them to be careful.
"5 hrs; visited Richley's saw-mill; found everything safe.
"2 hrs; instructing deer hunters to be careful with fire.
"6 hrs; visited Johnson Mills saw-mill and found mill not safe but he is moving to Bedford county soon.
"5 hrs; scouting over Sideling Hill mountain and spent some time brushing out important log road.
"2½ hrs; shadowing coon hunters who carried open torch.
"5½ hrs; shadowing a bunch of hunters who have been very careless with fire in the past.
"5 hrs; looking after Jno. Colter and William Henry's saw-mills and had them use a better screen.
"6 hrs; visited L. D. Keebaugh's and William Comerer's saw-mills and found them in good shape.
"5 hrs; following traction engine passing through the forest land and which had no screen on stack."

Summary of Patrol Service, 1917.

County.	Number of Men.							Paid by Department.	Paid by Association.	Paid from Protection Fund.
	April.	May.	June.	September.	October.	November.	December.			
Adams,	2	2	------	------	------	------	------	$68 80	----------	$80 00
Bedford,	3	3	------	------	------	------	------	71 60	----------	110 40
Blair,	------	------	------	------	------	1	------	----------	----------	22 50
Bradford,	1	1	------	------	------	------	------	24 00	----------	20 00
Cambria,	1	1	------	------	2	2	------	----------	----------	150 00
Cameron,	4	4	------	------	------	------	------	45 40	----------	68 60
Centre,	7	12	------	------	2	4	1	65 33	$82 50	596 70
Clearfield,	1	3	------	------	------	------	------	----------	----------	123 07
Clinton,	4	6	------	------	------	------	------	45 00	----------	297 40
Cumberland,	1	4	------	------	------	------	------	45 00	----------	165 00
Elk,	2	1	------	------	------	1	------	72 78	----------	64 47
Fayette,	1	1	------	------	1	1	------	----------	----------	19 71
Franklin,	9	11	------	------	14	14	------	22 50	----------	293 00
Fulton,	11	11	------	------	26	26	------	----------	----------	194 60
Huntingdon	4	8	------	------	1	5	1	92 40	----------	337 60
Luzerne,	------	------	------	------	1	1	1	----------	----------	92 02
Lycoming,	1	4	------	------	------	------	------	45 00	----------	160 00
Mifflin,	2	2	2	------	------	2	2	77 40	----------	164 00
Monroe,	7	10	4	2	4	4	2	----------	538 47	585 47
Pike,	1	2	------	------	1	1	1	27 00	----------	127 20
Potter,	3	5	------	1	1	1	1	84 00	----------	253 65
Somerset,	------	------	------	------	------	2	------	----------	----------	24 30
Tioga,	5	3	1	------	------	------	------	57 46	----------	80 00
Union,	2	2	------	------	------	------	------	69 20	----------	95 00
Westmoreland,	------	------	------	------	1	2	------	----------	----------	65 65
Total,	72	96	7	3	54	67	9	$912 87	$620 97	$4,190 34

FIRE TOWERS

Two new steel towers were erected in August and September of this year, one on Sand Mountain, Union County, the other near Cherry Springs, Potter county. The towers are sixty feet high and from each of them the observer can detect the first smoke of a fire anywhere within a radius of from 15 to 25 miles. A tabulation of the cost of these towers follows:

	Sand Mountain Tower.	Cherry Springs.
Cost of tower,	$350 00	$350 00
Freight on towers,	24 98	24 98
Staking out site and digging holes,	26 72	54 03
Foundation,	50 40	47 42
Erection,	173 91	127 94
Road and improvement to site,		16 80
	$626 01	$621 17

In the fall of 1916 quotations on towers were received from ten or twelve firms. In the spring of 1917 quotations were again requested and the prices had increased from 30 to 45%. These towers were purchased from the Aermotor Company of Chicago.

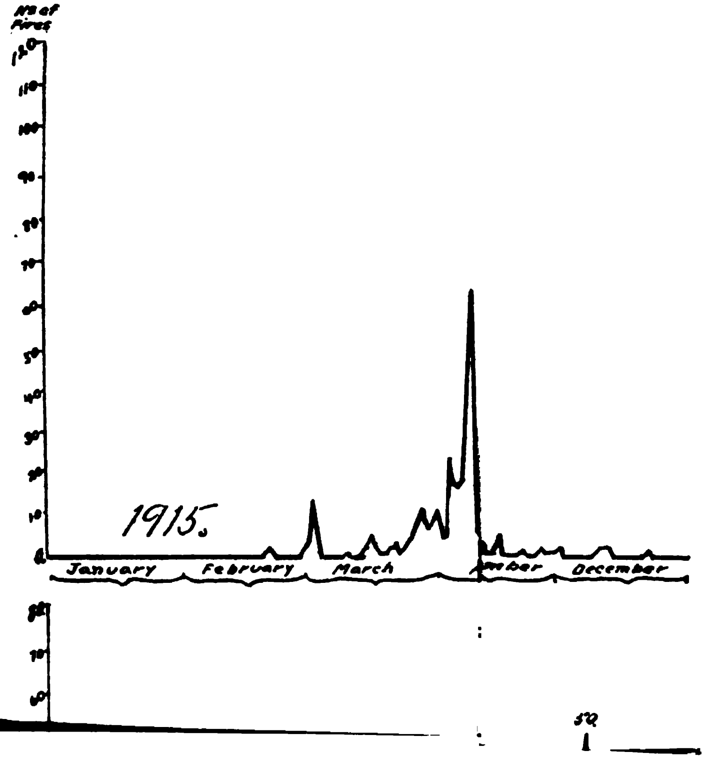
A right of way for a telephone line to the Sand Mountain tower has been cleared and poles set between the forester's headquarters and the tower, a distance of four miles. Needless to say that the efficiency of the tower will be greately handicapped until the wires are strung. For the Cherry Springs tower a set of stairs has been ordered. The tower stands near a much traveled State highway and attracts a great deal of attention. Making the top of the tower possible of access will mean enjoyment for many people and at the same time an increased interest in forest protection by the people. The stairs will also mean less danger of accident to our observer who would otherwise have to use the iron ladder.

The Cherry Springs tower is farther away from habitation than the Sand Mountain tower and a telephone connection is an absolute need to make it of value in fire season. Notwithstanding the present cost of telephone equipment, connection should be made at once, with the existing State telephone system.

NEW FORMS

On account of the new oath of office required of all wardens a new form of forest fire bill was printed and put into use at the beginning of the year.

There has also been a desire upon the part of some foresters to have their wardens notify them promptly of fires that have occurred. A postal card form (15A) has been prepared so that a warden may



A postal card form (15A) has been prepared so that a warden may give a brief report as soon as the fire is extinguished and mail the card to the forester. A few cards have been sent to each of three foresters for trial next spring. If satisfactory results are obtained the form will be made permanent.

With the definite policy of patrol now established on forests other than those owned by the State, there is need for a form upon which patrolmen and towermen may make daily reports. This has now been provided for in book form in such a way that the patrolmen will make a duplicate report at the end of each day, one report remaining in the book, the other being removed and forwarded to the forester to whom he reports. The books will be available for use in the spring of 1918.

In visiting a number of wardens it was found that seldom, if ever, do they have their papers together. In fact not infrequently their papers have become lost among the household effects so that bills have not been presented in time to be paid and more or less tardiness is the rule. A sufficient number of strong manilla envelopes, large enough to hold the forms and correspondence for a year have now been obtained. As soon as the State printer can finish printing a few general instructions on the face of the envelopes, one will be forwarded to each warden.

FIRE SEASON

More forest fires have been reported this year than in any previous year. The spring season was above the average for fire danger and for number of fires reported. On May 12th reports had been received for close to 750 fires, which averaged however, only eighty-six acres per fire. This average was just a little more than one-half the average for the entire year of 1916, and indicates advancement in efficiency of the fire warden system as far as extinction is concerned. Immediately following this date, conditions over the state improved for fires, there being but little rain and a high dry wind. The number of fires and their size increased rapidly until the 15th of May, when 157 fires were reported as burning. (See Plate).

When these bills began coming in our force was swamped and it was not until July 21st that correspondence and desk work became normal again. At that time it was found that our appropriation was exhausted and the unpaid bills would require an additional amount of $15,437.00, which by this time has been provided for by the Legislature.

In the meantime H. W. Siggins, Clerk of the Bureau, enlisted in the 10th Engineers (Forest) and left July 19th for Columbus Barracks. On August 4th the stenographer assigned to the Bureau resigned to take a better position. A new one began work on September 10th, and another on October 1st, the latter leaving again on December 29th. In order to catch up with some of the necessary tabulation work a young lady was employed from August 23d to September 11th at $50.00 per month.

There were few fires during the summer and fall months until November. It was believed that few hunters would be in the woods, but the Game Commission figures show that more hunters used licenses this season than ever before. The woods were full of hunters as usual and with unusual dry weather again into late November, numerous fires occurred. An unusual number of these fall fires arose from hunters smoking game out of logs or trees.

Comparison by Months.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1915, ----------	------	3	84	739	94	18	1	------	------	34	119	9	1,101
1916, ----------	4	------	9	181	307	5	2	23	30	127	220	115	1,013
1917, ----------	2	6	143	897	688	8	1	4	8	13	313	4	2,087

AREA BURNED

Compared with the fires of 1916 there were just about twice the number of fires and number of acres burned. Compared with 1915, previous to reorganization, there were twice the fires, but 17,000 acres less area burned in 1917. Had the same conditions as to organization existed as in 1915, with twice the number of fires it is reasonable to suppose that there would have been close to 600,000 acres burned over, using the same average acreage per fire as resulted in 1915. Organization seems to show, then, a saving in 1917, of 300,000 acres, or of almost $600,000.00 of direct loss to timber land owners.

It is again worthy of note that only 3% of the total number of fires were responsible for 44% of the area burned and that 28% of the fires were responsible for 91% of the area burned. When it is remembered that fires increase in size in geometrical proportion, it can be readily seen that the only way to reduce the heavy loss is to restrict fires to small size by having them detected quickly and by having a force of men at them quickly. Promptness must be the motto of a forest fire organization.

Comparison by Acreage.

	Less Than 1 Acre.		1 to 100 Acres.		100 to 1,000 Acres.		More Than 1,000 Acres.		Total.	
	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.
1915, ----------	61	31	639	20,687	323	115,116	73	200,851	1,101	336,685
1916, ----------	103	25	662	14,269	220	60,568	28	79,890	1,013	154,752
1917, ----------	237	57.87	1,264	27,532	521	149,482	66	141,228	2,087	319,339

FIRE CAUSES

Much could be written about the causes of forest fires but it is sufficient now to state that in 1917 the number of fires started along railroads was 36% of the total. This is an increase in percentage as compared with 1915 and 1916 by about 33 1/3%. The railroads are still one of the big sources of fire trouble. Most companies are doing something toward prevention but it is a notorious fact that they are hiding behind a court made law of "no negligence" which is much out of date. The newer and more efficient spark arresters are not being used properly, engines are not steamed efficiently, rights of way are not cleaned of inflammable material during fire seasons, patrols are not maintained during dangerous seasons at danger points and no equipment is provided for section men to use for extinction of fires. Until every railroad within the state having right of way through or near forest lands does all of the above things in an efficient manner, they cannot consistently declare themselves as not being negligent.

At the same time some companies are endeavoring to start this work and are handicapped by the carelessness of landowners along the right of way. These owners must do their part, too, by not permitting a fire hazard to develop or to continue upon their property. In fact railroad, landowner, and State must cooperate in the elimination of hazards along railroad lines.

Farmers, hunters, and lumbermen are also responsible for a great many fires for which there is absolutely no excuse. The railroad engine must run and coal seems to be the only practical fuel, but a farmer does not have to burn brush, grass, and fence rows at a time when everything is dry and the wind is high, neither does a hunter need to build a fire in the woods without making everything safe before the fire is started and without entirely extinguishing the last spark before leaving it. Lumbermen must run their engines both at the mill and on their logging roads, but there are spark arresters made that will entirely eliminate the possibility of fires;

and on extremely dry, windy days engines may be stopped in order to do other necessary work. These fires are unnecessary and are the result of indifference and carelessness, nothing else.

Of the large number of fires classed as unknown, it is safe to estimate that they may very properly be pro rated among the known causes in the same proportion as known fires now stand to the total. This would mean that railroads in 1917 were responsible for from 40 to 50% of all the fires; farmers, hunters, and lumbermen for from 40 to 45%. A large number of railroad fires may be prevented, and those that do occur may be more promptly controlled. Ninety-five per cent. of the remaining fires can be prevented and when such fires occur a heavy penalty should be meted out promptly.

Comparison by Causes.

	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.	Total.
1915,	274	105	120	136	28	19	37	382	1,101
1916,	270	55	95	182	44	10	45	312	1,013
1917,	756	173	127	200	45	8	52	731	2,087

State Forest Land Burned—1915, 1916 and 1917.

County.	Total State land June 1, 1917.	Area Burner.		
		1915.	1916.	1917.
Adams,	20,886	1,540	134	1,653
Bedford,	10,018	125	160	----------
Cameron,	81,194	1,410	6,085	507
Centre,	78,445	2,408	5,134.2	227.5
Clearfield,	47,506	25	3.2	140
Clinton,	129,244	13,275	472.5	1,070.3
Cumberland,	20,681	5,550	892.5	935
Dauphin,	3,354	2,000	----------	105
Elk,	14,840	135	100	200
Franklin,	33,910	502	604.6	3,293.6
Fulton,	6,300	----------	----------	----------
Huntingdon,	57,290	17	5,473.3	206
Juniata,	8,178	----------	327.7	----------
Lackawanna,	4,956	----------	800	150
Lycoming,	88,981	2,704	1,780.1	3.900
Mifflin,	49,526	137	1,597.1	640.5
Monroe,	6,401	----------	----------	50
Perry,	27,376	2,150	----------	800
Pike,	57,254	6,155	394	335
Potter,	129,707	365	180.8	160
Snyder,	19,086	2,825	1,615	----------
Somerset,	3,467	78	----------	----------
Tioga,	57,406	105	1,178	66
Westmoreland,	5,065	70	----------	----------
Union,	53,675	387	786	3
Wyoming,	1,177	----------	----------	----------
Total,	1,010,923	41,963	27,718	14,441.9

OUTSIDE WORK

In addition to attending each of the meetings of fire wardens at Williamsport, Mt. Holly, Graeffenburg, Uniontown, Ligonier, Somerset, and Stroudsburg, various other trips were necessary into different parts of the state. More work should have been done outside the office but could not be undertaken because of the unsatisfactory method of requiring a State employee to advance his own money for traveling expenses, the amount of which is not refunded for from one to two months.

Jan. 22.	Reading, in re printing Report on Forest Protection in Anthracite Region.
Feb. 1.	York, York Water Company lands in re cutting and planting.
Feb. 9.	Reading, Protection Report.
Feb. 20-21.	Altoona, Frankstown and Hollidaysburg in re forest fires of 1916.
Feb. 24.	Lancaster, Lecture before Iris Club.
March 2.	Pottsville, Temporary organization of Anthracite Forest Protective Association.
March 7.	Wilkes-Barre, in re Commonwealth vs. Lehigh Valley R. R. Co.
March 12.	Philadelphia, Council Pennsylvania Forestry Association.
March 13.	Sellersville, Lecture under auspices of local Game, Fish and Forestry Association.
March 15.	Pottsville, Conference with committee on constitution and by-laws, Anthracite Forest Protective Association.
March 20.	Conference with District Attorney of Fayette county in re several forest fire cases.
March 21.	Conference with District Attorney of Westmoreland county in re several forest fire cases.
April 6.	Wilkes-Barre, Meeting Anthracite Forest Protective Association.
April 16.	Carlisle and Mt. Holly in re spring fires set by railroad engines.
April 17.	Rockville, Fighting fire. Clerks and several other foresters out also.
April 20.	Washington, D. C., Conference with J. G. Peters of U. S. Forest Service in re National Defense.
Apr. 25-26.	Medix Run, In re fire set by railroad engines.
Apr. 26-27.	Penfield, In re fire set by railroad engines.
April 27.	Ridgway, Conference with District Attorney of Elk county in re railroad fires.
April 30.	Philadelphia and Paoli, in re origin of several recent fires.
May 8.	Lakemont, Lecture before Local Forest Fire Association.
May 16.	Reading, Pottsville, Brockton. Inspected D. & H. R. R. Co. red oak plantation at Brockton.
May 16.	St. Clair, Investigating fires set by engines of St. Clair and Mt. Hope Coal Companies.
May 17.	New Ringgold and Andreas. Investigated fires along Lehigh Valley Railroad.
June 14.	Lehighton and Ashfield, In re fires of neighborhood.
June 20-24.	Pittsburgh, Annual meeting of Pennsylvania Forestry Association.
June 25-July 9.	Western Penna., Looking after new wardens. (Siggins.)
June 27-28.	Carsonville, Dauphin, Halifax. In re fires of neighborhood and activities of wardens.
July 27.	Holtwood, Inspection of forest property of Pennsylvania Water and Power Company.
Aug. 2-3.	Mont Alto, Forest Academy.
Aug. 6-10.	Mifflinburg and Forest House. Erection of tower on White Deer Forest.
Aug. 14.	Penfield, In re origin and settlement for brush fire.
Aug. 15.	Sabula, In re same fire as above.
Aug. 16.	Farrandsville, In re Queen's Run fire.
Aug. 17.	Coatesville, Annual meeting United Sportsmen of Pennsylvania.
Sept. 24-27.	Coudersport and Cherry Springs. Erection of Steel tower at Cherry Springs.
Nov. 20-22.	Bedford, Inspection of lands offered to Department.
Dec. 4.	Erie, Inspection of Auxiliary Forest Reserve.
Dec. 5.	Endeavor. Inspection of Auxiliary Forest Reserve.
Dec. 12-14.	Boalsburg, State College, Bellefonte. In re fires set by B. C. R. R.
Dec. 31.	Pittsburgh, Annual meeting Society of American Foresters.

PUBLICITY

There is no question as to the value of publicity regarding forest fires. The attention of the public must be called to the cause of fires and the results of fires. Every effort should be made to get our people to think of forest protection as they think of the protection of their homes. There is still more truth than poetry in the old adage, "The care of the forest brings all blessings." But people do not accept an abstract proposition of this kind without reason, nor until they can see some of the "whys" and "wherefores."

Our attempt to reach the public this year has not been satisfactory, although several very important new steps have been taken. In

March 2,500 posters for Post Offices were distributed to foresters, fire wardens, and postmasters. Very few Post Offices in counties having forests or woodlots were missed.

Numerous requests came in for a poster suitable for use in small woodlots as well as in forests. The following was adopted from a poster used by another State:

GOOD TIMBER
is the crop that the owner of this land
wants to grow

DO NOT SET IT ON FIRE
Fire causes decay in the large trees, kills the
young growth, and burns up the
fertility of the soil

A GOOD NEIGHBOR
is more careful of another man's property
than he is of his own. No one has any
more right to set fire to another
man's woods than to his
house or barn

BE CAREFUL WITH FIRE
When you see a fire put it out or
notify the nearest forest fire warden
(See Bell telephone directory)
PENNSYLVANIA DEPARTMENT OF FORESTRY
Harrisburg, Pa.

A poster printed by the New Hampshire Forestry Commission calling attention to tourists to forest fires was also adapted to our needs.

HIGHWAY
TOURISTS
You Can Prevent
Forest Fires

Do not throw lighted matches, cigarettes, or cigars, along the roadside from automobiles or carriages.

Such careless acts cost thousands of dollars of public money and destroy the beauty and value of thousands of acres of land. Burned forests pay no taxes for roads.

If you see a fire, put it out immediately. If this is impossible, call the nearest forest fire warden. The telephone central can find him.

PENNSYLVANIA DEPARTMENT OF FORESTRY,
Harrisburg, Pa.

The report covering forest fire data for 1916 was ready on February 23rd, and should have been available for distribution before the spring fire season. It was received, however, on August 10th. Since then almost all of the 5,000 copies have been disposed of.

In February, there were printed at Reading as a preliminary step in the organization of a protective force in the anthracite coal region 1,000 copies of the report drafted by the Chief Forest Fire Warden and approved December 29, 1916, by the Committee appointed at a meeting in Hazleton, September 29, 1916. This was a 27 page report, with 25 illustrations and one line cut. 500 of them were distributed previous to the organization of the Anthracite Forest Protective Association, the other 500 being held for distribution by the Association. This printing was made possible by reason of a gift of $1,000 to the proposed association from a friend interested in forest protection.

In March a contract with the Bell Telephone Company was signed, by reason of which there was printed in telephone directories, covering fourteen different districts, the list of forest fire wardens within the district covered by each directory. This list gives the name of the warden, his address, the county and township in which he lives and how he can be reached by telephone. Although this printing was paid for at regular advertising rates yet it was cheap publicity, for it was equivalent to the printing and distribution of from 60,000 to 75,000 lists of wardens and put those lists beside a telephone in each instance.

In addition to the above there were distributed some circulars and stickers such as have been referred to in previous reports. The supply of such printed matter is entirely exhausted.

The moving picture film "The Curse of the Forest" was shown a number of places and undoubtedly had done much good.

During the year the following addresses were delivered by the Chief Forest Fire Warden:

February	24.	Iris Club, Lancaster. Conservation of Forests and Work upon State Forests. (About 75 present.)
March	13.	Auspices of Game, Fish, and Forestry Association, Sellersville. (About 30 present.)
March	27.	Auspices of Pocono Protective Fire Association. Stroudsburg. Forest Protection (with moving picture film.) (About 200 present.)
May	8.	Blair Pioneer Forest Fire Association. Lakemont. Forest Protection. (About 30 present.)
June	21.	Annual Meeting Pennsylvania Forestry Association, Pittsburgh. Forest Fire Prevention, The Old Way and the New, with moving picture film. (About 100 present.)
August	2.	Forest Academy, Mont Alto. Forest Protection Work. (About 30 present.)
August	3.	Forest Academy, Mont Alto. What is Expected of a Forester in the Field. (About 30 present.)
August	17.	Annual Meeting of United Sportsmen of Pennsylvania. Forest Protection and its Relation to Game. (About 50 present.)
December	5.	Sunday School of Bethlehem Lutheran Church, Harrisburg. Trees, their uses and the need for their protection. (About 50 present.)

The State Foresters and others of the Department have made numerous addresses, records of which are not reported by this Bureau. The fire wardens frequently visit schools and other meetings and spread information upon the subject of fire prevention.

One of the very interesting methods used for calling attention of the people to our subject was carried out by one of our foresters. The following circular was mailed to every industrial plant in Westmoreland, Somerset, and Fayette counties:

Ligonier, Pa., March 17, 1917.

Gentlemen: We are trying in various ways to bring to the attention of the public the devastation which is brought about by forest fires, and to lead the people to realize how great losses of timber as well as immeasurable injury to game and fish and to the source of our water supply, may result through carelessly discarding a burning match or cigarette which may readily set fire to the dry inflammable material so common in the woods.

As a move to reach the laborers, we kindly request your co-operation, and ask that you assist us by placing on or within each of your pay envelopes on some pay day during the early part of April, a small "sticker," one of which is herewith enclosed.

We believe you realize the necessity of forest fire prevention and can not doubt that you will help us. Will you please fill in the blank at the bottom of the sheet, giving name and address, tear it off, and return it to us that we may know what number of "stickers" you can use? We also desire to ask that you post this letter in some conspicuous place about your office, or where it may be read by employes.

Thanking you, I am

Sincerely yours,

V. M. BEARER,
State Forester.

V. M. Bearer,
State Forester,
Ligonier, Pa.

Dear Sir: We will gladly assist you to bring to the attention of our employes the necessity of preventing forest fires, so far as we can, and wish to have about............stickers. We will distribute one with each pay envelope, as per your request.

Yours truly.

Fully 90% of the firms replied and almost 10,000 stickers were requested.

COOPERATION

The railroads within the state, while still responsible for a great number of fires have impressed upon their employes more than ever before the necessity of fire prevention. Other corporations and some individuals are distributing their own literature bearing upon forest fires. The Blair County Game, Fish and Forestry Association and the Pocono Protective Fire Association are to be commended for their publicity measures.

The following reports from protective associations show a very satisfactory growth during the year.

The Secretary of the Central Pennsylvania Forest Fire Protective Association enlisted in the National Army and the data covering the year's activities have been delayed and cannot be included herewith.

POCONO PROTECTIVE FIRE ASSOCIATION OF MONROE COUNTY

Report for Year Ending December 31, 1917

RECEIPTS:	
Balance on hand January 1, 1917,	$329 42
Dues and assessments for previous years,	4 00
Dues and assessments for current year,	556 11
Contributions in cash (directly or indirectly),	345 00
Refunds from the State,	609 19
Interest on deposits,	3 04
	$1,846 76

DISBURSEMENTS:

Fire Patrol,	$1,076 94	
Towers and telephones,	100 24	
Fire Wardens Fourth Annual Meeting,	80 10	
Secretary-Treasurer, allowance for expense of administration,	70 40	
Advertising,	34 19	
Postage,	38 50	
Printing and stationery,	26 05	
Distribution of seedlings to schools,	9 93	
Sundries (discount on loan, 1.00; affidavits, 2.25),	3 25	
		1,439 60
Balance on hand December 31, 1917,		$407 16

ASSETS:

Cash on hand,	$407 16
Unpaid dues for current year,	16 80
Towers and telephone lines,	150 00
Tools and equipment,	31 00
Refunds from the State (due),	127 97
	$731 93

LIABILITIES:

Outstanding bills for year's expenses,	None.

Area of forested land within protected region (acres),	140,000
Area belonging to members,	22,300
Rate of assessment per acre,	1 cent
Number of members, January 1, 1917,	246
Number of new members added during 1917,	79
Number of members on roll December 31, 1917,	307

McKEAN COUNTY PROTECTIVE FIRE ASSOCIATION

Report for Year Ending December 31, 1917

RECEIPTS:

Balance on hand, January 1st, 1917,	$61 91	
Assessments for previous years (arrears),	......	
Assessments for current year,	371 20	
Contributions in cash (directly or indirectly),	149 59	
Refunds from State,	84 98	
Value of contributions in labor or material,	......	
		$667 68

DISBURSEMENTS:

Printing and stationery,	$27 65	
Postage,	5 00	
Secretary-Treasurer allowance,	120 00	
Travel, telephone and telegraph charges,	......	
Rewards for essays, etc.,	......	
Towers and telephones,	......	
Tools and equipment,	......	
Patrolmen and observers,	......	
Office rent,	......	
Other outlay not itemized,	15 85	
Rewards for convictions,	......	
		168 50
Balance on hand December 31, 1917,		$499 18

ASSETS:

Cash on hand,	$499 18	
Unpaid assessments for current year,	8 00	
Unpaid assessments for previous years,	......	
Towers and telephone lines,	......	
Tools and equipment,	......	
Supplies,	......	
Refunds from State (due),	......	
		507 18

LIABILITIES:

Outstanding bills for year's expenses,	None.

Area of forested land within protected region,	Don't know
Area belonging to members upon which assessment is based,	46,091
Rate of assessment per acre,	.01
Number of members January 1st, 1917,	26
Number of new members added during year 1917,	27
Number of members on roll December 31, 1917,	53

ANTHRACITE FOREST PROTECTIVE ASSOCIATION

A movement for the organization of a forest protective association in the anthracite region of Pennsylvania was started in June, 1916, but the organization was not finally completed until April, 1917. This organization should do much toward reducing forest fire loss within its jurisdiction.

ANTHRACITE FOREST PROTECTIVE ASSOCIATION

Report for Year Ending December 31, 1917

RECEIPTS:		
Balance on hand, January 1st, 1917,	......	
Assessments for previous years (arrears),	......	
Assessments for current year,	804 25	
Contributions in cash (directly or indirectly),	718 80	
Refunds from State,	117 46	
Dues for current year,	3 00	
Value of contributions in labor or material,	......	
		$1.643 51
DISBURSEMENTS:		
Printing and stationery,	$234 05	
Postage,	3 00	
Secretary-Treasurer allowance,	......	
Travel, telephone and telegraph charges,	28 25	
Rewards for essays, etc.,	......	
Towers and telephones,	......	
Tools and equipment,	......	
Patrolmen and observers,	......	
Office rent,	......	
Other outlay not itemized,	15 76	
Rewards for convictions,	......	
		281 06
Balance on hand December 31st, 1917,		$1,362 45
ASSETS:		
Cash on hand,	$1,362 45	
Unpaid dues for current year,	2 00	
Unpaid assessments for previous years,	......	
Towers and telephone lines,	......	
Tools and equipment,	......	
Supplies,	......	
Refunds from State (due),	2 05	
		$1,756 25
LIABILITIES:		
Outstanding bills for year's expenses,		......

Area of forested land within protected region (acres),	500,000
Area belonging to members upon which assessment is based,	60,303
Rate of assessment per acre, 7-1-1917 to 1-1-1918,	.03
Number of members January 1st, 1917,	0
Number of new members added during year 1917,	26
Number of members on roll December 31, 1917,	26

"THE PRIMEVAL FORESTS WERE OUR HERITAGE. WILL COMING GENERATIONS BE PROUD OF THE FOREST HERITAGE WE ARE LEAVING THEM?"

"EVERY LOYAL CITIZEN OF PENNSYLVANIA WILL DO HIS BEST TO PREVENT AND TO EXTINGUISH FOREST FIRES."

Detailed Statement of 1917 Expenses Incurred by Protective Associations, Submitted and Approved During 1917.

	Printing and stationery.	Postage and express charges.	Secretary's allowance.	Clerk hire.	Tower and telephone lines.	Distribution of seedlings.	Patrolmen.	Meeting of fire wardens.	Office rent.	Affidavits.	Paid by Association.	Paid by State.
Anthracite Forest Fire Protective Association,	$231 05	$0.87		$3.00							$117 46	$117 46
Central Pennsylvania Forest Fire Protective Association,	47 06			2 50	$20 00		$165 00		$18 00	$1 00	126 80	126 76
McKean County Protective Fire Association,	37 40		$100 00	8 00						1 00	73 19	73 21
Pocono Protective Fire Association,	65 75	36 34	70 40		100 24	$9 93	1,076 94	$45 25		2 00	702 44	704 41
	$381 26	$37 21	$170 40	$13 50	$120 24	$9 93	$1,241 94	$45 25	$18 00	$4 00	$1,019 89	$1,021 84

BLAIR PIONEER FOREST FIRE ASSOCIATION

At Lakemont, which is a suburb of Altoona and which is close to the mountains south of the city, a number of men formed an organization for the purpose of promptly suppressing forest fires in their neighborhood. Between 150 and 200 men pledged themselves to do everything they could to prevent and extinguish forest fires. The organization has no dues and is entirely based upon the welfare of the community. Meetings are held in the local fire house, and a special fire alarm indicates the existence of a forest fire. This organization is the first of its kind in the state. Something of its kind should be in every community.

All game protectors were made special forest fire wardens previous to the fall fire season and have again rendered valuable assistance in the suppression of fires.

The Boy Scouts in a number of instances have been commended for their assistance.

We have had the co-operation of many people in many places and in many ways. Their help is appreciated and is here acknowledged.

MERIT BADGES

In a number of states, there exists an arrangement through which boys and girls, who do some unusual thing in connection with the discovery or extinction of a forest fire, resulting in saving a life or property, receive from the Commonwealth, a badge of merit. In Michigan there are the Forest Scouts; in several states there is the Sylvan Sentinel League; in others the badges are given through the Boy Scout organization.

The idea back of this movement is good and is especially applicable under present conditions in Pennsylvania. With limited appropriations we cannot employ watchmen and patrolmen as we should. With labor scarce and wages high, our wardens cannot get help as conveniently as necessary. Any arrangement which will interest the young people and especially through the idea of community service is of value to the boy or girl, the community, and to our particular work.

The following suggestions are therefore presented with the hope that they may be put into effect in 1918:

The Department of Forestry shall obtain each year 100 badges to be given for something of merit in connection with the prevention and extinction of forest fires. These badges shall be allotted to various wooded sections of the state, with a few for the state at large, Claims for the badge must be presented to the Department through the nearest Boy Scout official (this organization being most widely spread in the state) with a clear statement of the case and supporting proof. Claims shall be acted upon by the Scout Commissioner of Dauphin County, the Commissioner of Forestry, or someone designated by him, and the Chief Forest Fire Warden. With each badge should be a certificate signed by the Governor and the Commissioner of Forestry setting forth the reason for its being given. The badges should be within the reach of any boy or girl in the Commonwealth between the ages of 8 and 18 years.

LEGAL AFFAIRS

While it is felt that some progress has been made in the matter of bringing to justice those who are responsible for forest fires, yet there have been so many obstacles put in the path that even the little success is discouraging. It seems to be the opinion of the majority of those who are supposed to represent the Commonwealth in a legal capacity in the various counties that forest fires may be set with impunity and that the criminal law cannot touch them. This condition of affairs means that the law must be amended at the next session of the Legislature, in order to cover the present deficiency.

Twelve suits are still pending. The following instances in which legal action was attempted but could not be obtained are self explanatory.

BLAIR COUNTY.

On April 18, 1916, Frank Beers was running a stave mill which was owned by the Edward Bell Company of Pittsburgh. The evidence first reported was to the effect that sparks from the engine set fire to a dead snag close to the mill and that the employes observed the burning snag but paid no attention to it. This case was referred to Attorney General, May 23, 1916, and it was to be referred to the State Police for further investigation. For some reason or other it was never referred to the State Police. On October 10, 1917, it was referred to our District Forester and after investigation of conditions, on October 25th he recommended that the case be dropped on account of lack of evidence.

CAMBRIA COUNTY.

On October 14, 1917, two boys by the name of John and Frank Nobuda started a fire which burned about two and one-half acres of grass land, endangering the adjoining forest land. Fire was suppressed by fire warden, Mr. Weller, and the two boys were caught. Warden took them to their home and had a very satisfactory talk, both with the boys and their parents. Family is extremely poor, being kept practically by the neighbors. Prosecution is out of the question.

CLEARFIELD COUNTY.

It appears that eight boys caused a fire which burned over about 10 acres of private land on April 22, 1917. Case was referred to the District Attorney and the Probation Officer at Clearfield, but notwithstanding the fact that our fire warden reported the names of the boys responsible, and the names of individuals who could furnish information concerning the origin of the fire, the District Attorney could find no evidence against the boys and as one of the families shortly afterward moved out of the neighborhood, the case was dropped without anything being done.

CLINTON COUNTY.

Queen Run Fire Brick Company operates dinkey engine from the mines to the plant and a number of fires have been reported as having been started by their engine in the last few years. In the case of a fire of April 9-13, 1915, there seemed to have been sufficient evidence against them, and complaints were received on account of them from various sources. Bill for the extinction of this fire was presented to them, but they refused to pay it. On May 23rd, instructions were issued to our forester to present the matter to the District Attorney. District Attorney refused to do anything. On July 2d, case was referred to the Attorney General, who also advised against prosecution. Again an effort was made to have the company reimburse the Commonwealth for the cost of extinction and they again refused. With both the Attorney General and the District Attorney against legal action, nothing more could be done.

FULTON COUNTY.

On October 20, 1917, Russel and Daniel Mentzer, sons of Jerry Mentzer, set fire to a hollow tree on their father's land, in order to smoke out a squirrel. The boys thought they had extinguished the fire before leaving the tree, but it started up again and attracted the notice of one of our fire wardens, who went into the woods, cut down the tree and extinguished the fire at an expense of 75 cents to the Commonwealth. Boys were written to and asked to reimburse the Commonwealth.

It appears that this case may be a violation of section 16 of the 1917 Game Code, and the case was referred to the Secretary of the Game Commission on November 14th for his consideration.

On November 26th, the Secretary of the Game Commission, ruled that above actions did not constitute a violation of the Game Law and consequently no legal action could be taken.

FULTON COUNTY.

On April 30, 1916, a fire occurred near where three men had been working. Evidence seemed satisfactory. Referred to the Attorney General June 12, 1916. No action taken. March 3rd this case was referred to our forester and upon investigation we found that the chief witness in the case had died. Consequently the case was dropped at once without further action.

LACKAWANNA COUNTY.

Commonwealth vs. Wentzel, Wentzel and Brady, for refusal to aid a fire warden at fire of May 4, 1916.

This case was referred to the Attorney General, May 10, 1916, and instructions were given to bring suit against the three defendants. S. P. Wentzel waived a hearing and gave bail for an appearance at court. Christ Brady was bound over for court. Ralph Wentzel was dismissed on account of being only 16 years old, notwithstanding the fact that he had been receiving a man's wages for the last two years. The grand jury ignored the case against Brady, but found a true bill against Wentzel. On the 21st of October, 1916, a jury pronounced a verdict of not guilty in the case of Wentzel.

At first it was our intention to reopen suit against Brady and the younger Wentzel, but subsequent developments show that they had learned the lesson which we desired them to learn and the suits were not reopened.

SOMERSET COUNTY.

Our fire warden believed that he had sufficient evidence to catch the party responsible for a fire of October 22, 1916. This case was taken up with the State Police Captain located at Greensburg, Westmoreland county, and after some investigation it was decided that the case should be dropped entirely on account of lack of definite evidence.

WESTMORELAND COUNTY.

Commonwealth vs. Blair Lumber Co., for fires of November, 1914, and of May, 1915.

Blair Lumber Company, apparently, was the cause of a number of fires in the neighborhood of State Forest land in November, 1914, and May, 1915, and an effort was made to get them to reimburse the

Commonwealth for the cost of extinction of these fires, also to have them pay for the damages done to State land. Nothing could be obtained from them, and the case was postponed until July 12, 1916. At this time it was referred to the Attorney General who endeavored to have some settlement made. At the beginning of 1917, this case was referred to the District Attorney of Westmoreland county, who promised to obtain an amicable settlement, and advised against legal action. No settlement has ever been received, consequently the case has been dropped.

The following twenty-one cases may be considered as being more or less successful in results, even though convictions were not obtained in all cases.

BLAIR COUNTY.

Commonwealth vs. McKelvey Bros., for fires of 1916.

Referred to Attorney General, April 25, 1916. In same month placed in the hands of the District Attorney of Blair county, who refused to take action. February, 1917, Chief Forest Fire Warden made a detailed investigation on the ground, examined into the evidence, etc., appeared before a justice of the peace in Hollidaysburg, and made information. After returning to Harrisburg each detail was gone over carefully and it was found that nothing could be done in this case because of the fact that a contract with the individual whose lands were burned over gave the McKelvey Bros. the right to burn over his land if they so desired. Action was therefore withdrawn on the 26th day of March.

BRADFORD COUNTY.

Commonwealth vs. George Whipple, for fire of February 19-20, 1917.

This fire was one in which a considerable quantity of sawed lumber was burned and circumstantial evidence pointed to the defendant as being responsible for the fire. The owner of the lumber employed an attorney and brought suit, but requested some assistance from this Department. On February 27, case was referred to Department of State Police. Careful investigation was made and the matter was submitted to the Attorney General on March 17th. Offer of assistance was made to the prosecuting attorney. The grand jury ignored the bill.

CAMBRIA COUNTY.

Commonwealth vs. Joseph and William ———, for fire of March 31, 1917.

Our local forest fire warden referred what information he had to the constable at Johnstown. The constable made the arrest and because the boys were under 16 years of age, took them to the probation officer, who was willing to let them off providing they paid the costs, amounting to $16.46. This their parents refused to do. They were then sent to detention rooms at the county seat for thirty days. In less than a week, the parents paid the costs and thus settled the case.

CARBON COUNTY.

Commonwealth vs. George Hoffacker, for fire of May 15 and 16, 1917.

The origin of this fire was investigated by our local forest fire warden and district forester. It was found that the fire was started on a very windy day not more than 12 feet away from woodland. The case was referred to the District Attorney of Carbon county and suit was started by our fire warden. Attorney for defendant asked for a settlement of the case and we offered to settle for payment of costs and $25.00 towards cost of the extinction of fire. It cost the State $107.07 to extinguish the fire. The proposition was ignored and the case came before the grand jury. The grand jury ignored the indictment.

CARBON COUNTY.

Commonwealth vs. Wilson Searfoss, for fire of December 5-7, 1916.

Upon the request of a land owner in the neighborhood of where this fire burned, investigation was made into the origin of the fire. On February 19, 1917, Department of State Police was requested to make a detailed investigation. Following the investigation, the matter was referred to the Attorney General, March 17th, and instructions were given to start legal action. On April 2nd, the case came before the court, Searfoss plead guilty and the court sentenced him to pay a fine of $25.00, cost of prosecution which amounted to $31.05, and to serve three months in the county jail. Later, however, the jail sentence was suspended.

CARBON COUNTY.

Commonwealth vs. Nothstein, Schleir and Arner, for fire of May 13, 1917.

Investigation concerning the origin of this fire was made by our district forester. Our fire warden started suit, the boys were found guilty before the justice and desired to make settlement, if there was any way in which settlement could be made. They were asked to pay the cost of extinction of the fire which amounted to $21.97, and the costs of suit which amounted to $15.93. These amounts were paid by the defendants.

CARBON COUNTY.

Commonwealth vs. Pierce Ginder, for fire of April 11, 1917.

It appeared that Mr. Ginder was burning a fence strip and that woodland on opposite side of the road caught fire. Circumstantial evidence pointed to the fact that forest fire caught from fence strip, as a strong wind was blowing at the time, and during the time others were fighting the forest fire, no assistance was rendered by the individual who was supposed to have been responsible for its origin. Fire warden was instructed to bring suit at once. Hearing was held before a justice of the peace and those who were supposed to have evidence against Mr. Ginder had very poor memories on the date of the hearing. The justice could not make out a case. On June 15th, the matter was referred to the Department of the State Police and investigation made by State Policeman. His investigation was not successful in disclosing any evidence which would make it possible for us to hold Mr. Ginder, consequently the case was dropped.

CENTRE COUNTY.

Commonwealth vs. T———, D——— and H———, for fire of May 17-20, 1917.

One boy was arrested and the other two boys subpoenaed as witnesses. Hearing was held before justice of the peace and the information there obtained, submitted to the District Attorney. On June 13, 1917, case came before juvenile court. The judge gave the boys a very plain talking to, threatening to send them to a reform school if they came before him again on a similar charge. Parents of the boys as well were cautioned in regard to this matter. Costs were placed upon the county.

DAUPHIN COUNTY.

Commonwealth vs. Roy G., age 11, for fire of May 16, 1917, and May 17, 1917.

This boy was caught in the act of setting fire on the 17th of May and was taken before a local justice. On June 22nd, he appeared before the juvenile court in Harrisburg and after hearing the case, the judge paroled the boy and put him under the direction of a responsible individual in his neighborhood. The judge further directed the county to pay the costs in the case.

In connection with this case it developed that Dauphin county pays no witness fees in juvenile cases.

The excuse given by the boy was that he wanted to burn up the snakes near his home so they would not bite his baby brother.

FAYETTE COUNTY.

Commonwealth vs. John Holt, for fire of May 11, 1916.

Referred to the Attorney General, September 20, 1916. Mr. Holt acknowledged responsibility for this fire, in that he states that one of his employes undertook to burn brush upon his own responsibility and that the fire broke away from him, although it might have been scattered by some one who had a desire to burn up their fences. On May 21st our forester made information before the justice of the peace against G. D. Harshman who did this burning. Notwithstanding the fact that our advice was to the effect that this case should be dropped, on August 1st, we received from the District Attorney a check for $21.05, covering the cost for the extinction of this fire, the case evidently having been settled by payment of this amount and the costs of the suit to date.

FRANKLIN COUNTY.

Commonwealth vs. Herman McFern, for fire of November 12, 1916.

Referred to the Attorney General, November 14, 1916. Herman McFern, deaf and dumb, was caught in the act of setting fire, by a State Forest Ranger. Warrant for the arrest of the man was obtained immediately from a justice of the peace, and, although placed in the hands of several constables, no arrest was made. On February 28, 1917, McFern surrendered to a justice of the peace and was bound over for court. With permission of Attorney General, attorney was employed as counsel in this case which came up in May term of court. This young man was in court two years before this for the same offence, having been caught in the act by the same forest ranger, but in the former case was acquitted. In the trial an effort was made to prove an alibi and it was very successful. Witnesses swore that the young man was in four different places at the same time and the testimony of none of them could be shaken. He was convicted and the court sentenced him to pay $1.00 fine, the costs of prosecution, and to undergo imprisonment in the county jail for a period of sixty days. Before the expiration of his jail term, his counsel was to present the necessary papers for having the young man sent to a State institution for feeble-minded persons. At the same time we instructed our attorney to the effect that in case the defendant's counsel did not present such papers, we would have them presented ourselves. At the expiration of sixty days, it was necessary for the Commonwealth to ask that the young man be sent to a State institution.

The court appointed two commissions to investigate into the physical and mental condition of the young man and finally sent him home again with the admonition to his father that if he was ever caught setting fires again in the woods and came before the court, he would not be sent home another time. All of which means that that portion of Franklin county in which the young man lives may reasonably expect another series of incendiary fires until such time as the young man will be caught in the act another time.

LUZERNE COUNTY.

Commonwealth vs. Ed. and William ———, for fire of April 17, 1917.

These two boys were taken before the juvenile court and paroled.

LUZERNE COUNTY.

Commonwealth vs. Lehigh Valley Railroad Co., for fire of May 11-13, 1916.

Referred to the Attorney General, May 23, 1916. Fire burned over 10,000 or more acres of land. Department of State Police asked to make further investigation, which was done. Sufficient evidence was obtained to verify the responsibility of the railroad company for the fire. Inquiry was made from railroad officials as to the number of the engine which was responsible for the fire and the railroad officials themselves gave the number of the engine which pulled the same train one year previous to the fire. This particular engine was followed to the round house and upon inspection was found to have a very defective spark arrester.

Case was presented to the District Attorney of Luzerne county and it met with little encouragement at his hands. The Attorney General authorized the employment of a special attorney to handle the case. On July 7th, the judge after hearing only a part of the Commonwealth's evidence, declared that there was no negligence on the part of the railroad company, and consequently there could be no suit at law.

LYCOMING COUNTY.

Commonwealth vs. Frank Holden, for incendiary fires of December, 1916.

On January 18, 1917, Holden plead guilty before the Lycoming county court and was sentenced to the Huntingdon Reformatory. Later a commission was appointed to investigate into the young man's mental condition and he was declared to be a fit candidate for an insane asylum. He was transferred from the Reformatory to the Insane Asylum at Danville.

LYCOMING COUNTY.

Commonwealth vs. Lewis Venemen, refusal to assist forest fire warden in extinction of fire of December 8, 1916.

Referred to the Attorney General, December 20, 1916. January 19, 1917, hearing was held before the justice of the peace and Venemen was bound over for appearance at court following which he desired to settle the case. He was allowed to settle by paying the costs to date, which amounted to $22.46.

SCHUYLKILL COUNTY.

Commonwealth vs. Charles Bailey, for hindering the fire warden in the performance of his duties at fire of March 26, 1917.

The defendant is a section foreman on a branch of the Lehigh Valley Railroad along which numerous fires have been causing untold damage for a number of years. Our fire warden at the time was a member of the section crew. On date of fire he asked the forman to stop their motor car, in order to extinguish this fire. Foreman refused and carried the crew two or three miles away from the fire, where he claimed a more serious fire was burning. In June, case was turned over to the District Attorney of Schuylkill county and suit was finally started by our District Forester. The grand jury ignored the bill.

SCHUYLKILL COUNTY.

Commonwealth vs. George Sackalosky, for fire of May 19, 1917.

George Sackalosky was burning brush on his farm close to some woodlands in E. Union township. The fire spread from the brush piles to the woodlands and after burning for three days burned over some 700 to 1,000 acres of woodland. Our local forest fire warden was instructed to bring suit and on November 16, Mr. Sackalosky was convicted of a misdemeanor. The Attorney representing the Commonwealth, as well as the defendant's attorneys, then asked that on account of this being the first offense, mercy be shown. The judge stated that he had intended to place a fine of $100.00 upon the defendant, but on account of the plea for mercy, he would reduce the fine to $10.00, and place the costs upon him.

SOMERSET COUNTY.

Commonwealth vs. Allen Bittner, for refusal to assist fire warden in extinction of fire of May 20th and 21st, 1917.

Fire warden was instructed to bring suit against the defendant and the justice found him guilty and fined him $5.00, and imposed upon him the costs, amounting to $5.64.

SOMERSET COUNTY.

Commonwealth vs. Jesse Pletcher, for fire of May 19, 1917.

Fire supposed to have been of incendiary origin. After careful investigation surrounding the origin of this fire by our forester, the evidence was submitted to the District Attorney of Somerset county on September 21st. The defendant was asked in the first instance to settle the case by paying the cost of extinction and cost of collection, which settlement was refused. Criminal suit was then started before a justice of the peace. The difficulties met by our forester are set forth at length in his letter, which reads as follows:

> "At a hearing on Wednesday, December 19th, before Squire A. Kent Miller, bearing on our case against Jesse Fletcher, the case was dismissed on account of lack of evidence. This case results from a fire of May 19th, 1917, in Middlecreek township, Somerset county. The fire was reported by Warden D. A. Barron.
>
> "That you may realize what difficulty we have in advancing our cases, I wish to relate how this case progressed: When first considering the matter with the District Attorney and having decided to make information against the party we found both justices out of town on private business. This necessitated another trip to Somerset.
>
> "Having set the date for the hearing, December 18th, I received on the evening of December 14th, a letter from the squire in which he informed me that Mr. Pletcher had been subpoenaed but my witnesses had not been notified and I would be expected to notify them. The following morning I called the District Attorney to ask whether he would summon witnesses for the Commonwealth. This he consented to do.
>
> "Arriving in Somerset, Tuesday morning, December 18th, I went to the office of the District Attorney there to be informed that our witnesses had not been notified of the hearing. I then went to Squire Miller's office to learn that he had left town for the day. I also learned that Mr. Pletcher was requested to appear December 20th although the dockets showed the date, December 18th.
>
> "I then proceeded to arrange for the hearing the following day and tried to notify all parties (which was no small task). One of our witnesses whom, I think, could have given us valuable information had he desired, refused to consent to appear although he expressed his desire to see the defendant punished. The testimony of the other witnesses was of no account and was materially different from the assertions made before me when working up the case."

WESTMORELAND COUNTY.

Commonwealth vs. Harry Roadman, for fire of April 20, 1916.

Referred to Attorney General, May 23, 1916. Supposed to have been referred to the State Police for further investigation. No investigation, however, was reported to this office. The matter was later referred to the District Attorney of Westmoreland county and he recommended that the case be turned over to a justice of the peace for the collection of the cost of extinction. On September 11th, the case was settled by Roadman paying $8.01 to the justice to be forwarded to the State Treasurer and $6.59, which was the cost of collection.

WESTMORELAND COUNTY.

Commonwealth vs. Kuhns Family, for series of fires May, 1916.

Referred to the Attorney General July 29, 1916. Later referred to District Attorney of Westmoreland county and to Captain of State Police stationed at Greensburg. State Policeman made an investigation covering the fires and arrested one of the young men of the family, but evidence was not sufficient to prove the case against anyone, consequently the matter was dropped.

WESTMORELAND COUNTY.

Commonwealth vs. Jim Lute, for refusing to aid a fire warden in extinction of fire May 18th, 1917.

After action had been started, the justice of the peace went over the facts carefully and decided that since the fire warden had no witnesses with him when the defendant refused to assist him, it was probably best not to bring suit. Case was therefore dropped.

CLAIMS FOR COST OF EXTINCTION OF FOREST FIRES.

This year, we continued to present to persons who were reported as responsible for fires, claims for the cost of extinction. From the following lists it may be seen that this policy has been more or less successful. A number of cases we could not sustain and these were dropped, but even in such cases some good was done by bringing the subject matter to a number of people in a way that will induce care in the future. There are still pending 15 claims for 1916 fires and 250 claims for 1917 fires, 160 of which are against railroads.

Amounts Received In 1917 On Account Forest Fires.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.	Paid to Fire Warden.
Adams:							
Tyrone,	Mar. 29, 1917,	Engine,	$1 41	June 25,	P. & R.,	$1 41	
Tyrone,	Mar. 31, 1917,	Engine,	1 40	June 25,	P. & R.,	1 40	
Menallen,	April 3, 1917,	Engine,	2 16	June 25,	P. & R.,	2 16	
Menallen,	April 3, 1917,	Engine,	1 95	June 25,	P. & R.,	1 95	
Menallen,	April 11, 1917,	Engine,	45	Oct. 26,	P. & R.,	45	
Menallen,	May 14, 1917,	Engine,	1 13	Oct. 26,	P. & R.,	1 13	
Menallen,	April 23, 1917,	Engine,	3 00	Oct. 26,	P. & R.,	3 00	
Tyrone,	April 1, 1917,	Engine,	1 60	Oct. 26,	P. & R.,	1 60	
						$13 10	
Armstrong:							
Madison,	April 19, 1917,	Engine,	5 25	Aug. 28,	P. R. R.,	$5 25	
Madison,	April 28, 1917,	Engine,	7 50	Aug. 28,	P. R. R.,	7 50	
Madison,	May 15, 1917,	Engine,	1 65	Aug. 28,	P. R. R.,	1 65	
						$14 40	
Bedford:							
King,	May 2, 1917,	Saw mill,	2 11	June 15,	Henry Fetter,		$2 11
King,	May 15, 1917,	Saw mill,	5 40	June 15,	Henry Fetter,		5 40
Snake Spring,	May 3, 1917,	Burning mill site,	9 23	June 19,	O. S. Dunkle,	$9 23	
West Providence,	April 18, 1916,	Saw mill,	2 65	Aug. 28,	Blain Foor,	2 65	
						$11 88	$7 51
Berks:							
Cumru,	Mar. 20, 1917,	Burning brush,	60	May 23,	Geo. H. Horst,		$ 60
							$ 60
Blair:							
Taylor,	May 15, 1917,	Saw mill,	31 80	June 20,	F. W. Miller,	$31 80	
Logan,	May 12, 1916,	Burning brush,	5 15	Aug. 24,	M. L. Geisinger,	5 25	
Woodbury,	April 11, 1917,	Engine,	3 00	Sept. 5,	P. R. R.,	3 00	
Taylor,	April 18, 1917,	Engine,	4 05	Sept. 5,	P. R. R.,	4 05	
Blair and Frankstown,	May 15, 1917,	Engine,	87 90	Sept. 5,	P. R. R.,	87 90	
Snyder,	May 17, 1917,	Engine,	7 50	Dec. 14,	P. R. R.,	7 50	
						$139 50	

Bradford:							
Wyalusing,	April 18, 1917,	Burning rubbish,	4 06	May 4,	H. C. Wharen,	$4 06	
Wyalusing,	April 19, 1917,	Burning brush,	3 60	May 9,	H. S. Frazer,	3 60	
Granville,	April 16, 1917,	Burning brush,	14 47	May 29,	Jay E. Spencer,	14 47	
Terry,	April 18, 1917,	Burning grass plot,	7 64	June 11,	George Hoffman,	7 64	
Wyalusing,	April 25, 1917,	Engine,	1 50	Oct. 4,	L. V. R. R.,	1 50	
Wyalusing,	April 3, 1917,	Engine,	10 80	Oct. 4,	L. V. R. R.,	10 80	
						$42 07	
Bucks:							
Springfield,	April 11, 1917,	Burning brush,	4 90	May 17,	Mrs. Augusta Williams,		$ 25
							$ 25
Butler:							
Parker,	May 15-16, 1917,	Burning brush,	48 20	Sept. 10,	H. S. Daubenspeck,		$48 20
							$48 20
Cambria:							
Cambria,	May 15, 1917,	Burning brush,	29 60	June 14,	Robt. Gettings and Edward Bowers.	$29 60	
Jackson,	May 15, 1917,	Burning brush,	90	July 20,	Simon Griffith,		$3 00
Jackson,	May 23, 1917,	Burning leaves,	7 20	July 12,	Nanty Glo Coal Co.,	90	
Richland,	April 10, 1917,	Engine,	90	Sept. 10,	B. & O.,	90	
Richland,	April 3, 1917,	Engine,	30	Sept. 10,	B. & O.,	30	
						$31 70	$3 00
Carbon:							
Mahoning,	May 13, 1917,	Incendiary,	21 97	July 17,	Arner, Schleir and Nothstein.		$21 97
Towamensing,	May 11, 1917,	Burning weeds,	77 83	June 26,	Edwin Christman,		77 83
Packer and Banks,	May 14, 1917,	Engine,	19 13	Oct. 4,	L. V. R. R.,	$19 13	
Packer,	May 26, 1917,	Engine,	17 95	Oct. 19,	L. V. R. R.,	17 95	
						$37 08	$99 80
Centre:							
Snow Shoe,	May 15, 1917,	Burning brush,	4 95	July 17,	Chas. McLoughlin,	(a)$3 75	
Huston,	Mar. 26, 1917,	Engine,	13 55	Dec. 14,	P. R. R.,	13 55	
Snow Shoe,	April 18, 1917,	Engine,	1 20	Dec. 14,	P. R. R.,	1 20	
Snow Shoe,	April 18, 1917,	Engine,	14 30	Dec. 14,	P. R. R.,	14 30	
Snow Shoe,	May 14, 1917,	Engine,	9 75	Dec. 14,	P. R. R.,	9 75	
Union,	April 16, 1917,	Engine,	60	Dec. 14,	P. R. R.,	60	
Union,	April 17, 1917,	Engine,	60	Dec. 14,	P. R. R.,	60	
						$43 75	
Clarion:							
Beaver,	May 14, 1917,	Engine,	7 65	Oct. 26,	L. S. & M. S. R. R.	$7 65	
						$7 65	

(a) Refund.

Amounts Received in 1917 on Account Forest Fires—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.	Paid to Fire Warden.
Clearfield:							
Woodward,	May 10, 1916,	Drill engine,	49 90	Feb. 10,	T. G. Alabran,	$49 90	
Beccaria,	April 28, 1917,	Burning rubbish,	7 80	June 7,	John Thedora,	7 80	
Knox,	May 15, 1917,	Burning old hay,	13 00	June 20,	Hosea Bloom,		$13 00
Huston,	May 14-19, 1917,	Clearing,	152 85	Aug. 31,	Geo. Sherwood,	25 00	
Huston,	May 15, 1917,	Burning brush,		Aug. 27,		(b)4 50	
Huston,	April 10, 1917,	Engine,	80	Oct. 18,	P. R. R.,	80	
Huston,	April 11, 1917,	Engine,	4 35	Oct. 18,	P. R. R.,	4 35	
Huston,	April 11, 1917,	Engine,	5 80	Oct. 18,	P. R. R.,	5 80	
Huston,	April 12, 1917,	Engine,	1 20	Oct. 18,	P. R. R.,	1 20	
Huston,	April 17, 1917,	Engine,	80	Oct. 18,	P. R. R.,	80	
Huston,	April 17, 1917,	Engine,	80	Oct. 18,	P. R. R.,	80	
Huston,	April 17, 1917,	Engine,	80	Oct. 18,	P. R. R.,	80	
Huston,	April 18, 1917,	Engine,	4 25	Oct. 18,	P. R. R.,	4 25	
Huston,	May 15, 1917,	Engine,	98 35	Oct. 18,	P. R. R.,	98 35	
Chest,	May 14, 1917,	Burning brush,	14 90	Nov. 21,	Sam Straw,		14 90
Pike,	May 17, 1917,	Engine,	6 50	Dec. 14,	P. R. R.,	6 50	
						$210 85	$27 90
Clinton:							
Lamar,	May 18, 1917,	Road roller,	11 40	July 5,	Geo. Brungard,		$11 40
Woodward,	April 6, 1917,	Engine,	14 70	Sept. 17,	Q. R. F. B. Co.,	$14 70	
						$14 70	$11 40
Columbia:							
Greenwood,	April 1, 1917,	Birch distillery,	3 47	June 2,	Harry Miller,	$3 47	
Beaver,	May 14, 1917,	Burning brush,	4 80	June 21,	Lewis Brobst,		$4 80
Beaver,	April 9, 1917,	Engine,	9 00	June 25,	P. & R.,	9 00	
Fishing Creek,	April 18, 1917,	Engine,	23 45	June 25,	Bloomsburg & Sullivan R R.	23 45	
Beaver,	May 17, 1917,	Burning brush,	3 60	June 30,	John Fritz,		3 60
Fishing Creek,	May 17, 1917,	Burning brush,	13 40	July 6,	Martin Coleman,		5 30
Madison,	April 10, 1917,	Engine,	12 75	July 28,	S. B. & B. R. R.,	12 75	
Cunningham,	Nov. 6, 1916,	"Loki",	3 08	Sept. 17,	Lehigh Coal Co.,	3 08	
Beaver,	April 11, 1917,	Engine,	12 70	Oct. 26,	P. & R.,	12 70	
						$64 45	$13 70

(b) Refund.

Cumberland:							
S. Middleton,	April 10, 1917,	Engine,	60	June 25,	P. & R.,	$ 60	
S. Middleton,	April 16, 1917,	Engine,	90	June 25,	P. & R.,	90	
						$1 50	
Dauphin:							
E. Hanover,	April 4, 1917,	Engine,	22 20	June 25,	P. & R.,	$22 20	
Williams and Jackson,	April 16, 1917,	Engine,	108 45	Oct. 26,	P. & R.,	108 45	
						$130 65	
Elk:							
Horton,	April 10, 1917,	Engine,	3 00	July 6,	P. S. & N.,	$3 00	
Horton,	April 28, 1917,	Engine,	1 80	July 6,	P. S. & N.,	1 80	
Jones,	May 15, 1917,	Engine,	38 10	July 7,	P. S. & N.,	38 10	
Benezette,	April 12, 1917,	Engine,	5 84	Sept. 17,	P. R. R.,	5 84	
Benezette,	April 25, 1917,	Engine,	80	Sept. 17,	P. R. R.,	80	
Benezette,	May 15, 1917,	Engine,	5 40	Sept. 17,	P. R. R.,	5 40	
Benezette,	May 13, 1917,	Engine,	1 20	Oct. 18,	P. R. R.,	1 20	
Benezette,	April 17, 1917,	Engine,	80	Oct. 18,	P. R. R.,	80	
Benezette,	April 17, 1917,	Engine,	6 42	Oct. 18,	P. R. R.,	6 42	
Benezette,	April 17, 1917,	Engine,	20 65	Oct. 18,	P. R. R.,	20 65	
Benezette,	April 17, 1917,	Engine,	14 40	Oct. 18,	P. R. R.,	14 40	
Benezette,	April 17, 1917,	Engine,	90	Oct. 18,	P. R. R.,	90	
Jay,	April 17, 1917,	Engine,	1 28	Oct. 18,	P. R. R.,	1 28	
						$100 59	
Fayette:							
Springfield,	May 15, 1917,	Clearing,	5 55	June 26,	Arnold Johnson,		$5 55
Springfield,	May 18, 1917,	Burning brush,	27 70	July 2,	Frank J. Steindl,		27 70
Henry Clay,	May 11, 1916,	Burning brush,	21 05	Aug. 2,	John Holt,	$21 05	
Springfield,	Oct. 28, 1916,	Engine,	17 35	Sept. 28,	I. C. V. R. R.,	17 35	
Springfield,	April 17, 1917,	Engine,	90	Sept. 28,	I. C. V. R. R.,	90	
North Union,	April 20, 1916,	Burning brush,	24 62	Oct. 4,	R. M. Fry,	24 62	
						$63 92	$33 25
Franklin:							
Metal,	May 3, 1917,	Engine,	4 74	June 11,	C. V. R. R.,	$4 74	
Peters,	April 18, 1917,	Engine,	1 70	June 11,	C. V. R. R.,	1 70	
						$6 44	
Fulton:							
Licking Creek,	April 11, 1917,	Traction engine,	7 25	July 2,	Owner of engine,		$7 25
Todd,	June 3, 1917,	Brush fire,	4 44	July 3,	Lloyd Ray,		2 04
Licking Creek,	April 10, 1917,	Dinner fire,	2 40	July 3,			2 40
Taylor and Wells,	May 13-14, 1916,	Clearing,	44 15	Aug. 6,	W. F. Bergstresser,	$38 50	
						$38 50	$12 59

Amounts Received in 1917 on Account Forest Fires—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.	Paid to Fire Warden.
Huntingdon:							
Penn,	Mar. 25, 1917,	Engine,	1 20	May 21,	H. & B. T. Mt. R. R.,	$1 20	
Lincoln,	May 3, 1917,	Engine,	3 45	June 16,	H. & B. T. Mt. R. R.,	3 45	
Lincoln,	April 16, 1917,	Engine,	7 53	June 16,	H. & B. T. Mt. R. R.,	7 53	
Walker,	May 16, 1917,	Engine,	4 80	June 16,	H. & B. T. Mt. R. R.,	4 80	
Walker,	May 15, 1917,	Engine,	3 15	June 16,	H. & B. T. Mt. R. R.,	3 15	
Walker,	April 17, 1917,	Engine,	7 05	June 16,	H. & B. T. Mt. R. R.,	7 05	
Hopewell,	April 4, 1917,	Engine,	5 15	June 19,	H. & B. T. Mt. R. R.,	5 15	
Brady,	May 18, 1917,	Break in transmission wire,	15 64	July 28,	Penn Central Light and Power Co.	15 64	
Union,	April 11, 1917,	Engine,	10 27	Sept. 5,	P. R. R.,	10 27	
Porter,	April 23, 1917,	Engine,	3 00	Sept. 5,	P. R. R.,	3 00	
Spruce Creek,	April 28, 1917,	Engine,	11 80	Sept. 5,	P. R. R.,	(c)51 80	
Hopewell,	May 12, 1917,	Engine,	1 95	Sept. 17,	H. & B. T. Mt. R. R.,	1 95	
						$114 99	
Indiana:							
Grant and E. Mahoning,	Mar. 26, 1917,	Engine,	2 70	April 18,	Savan Coal Co.,	$2 70	
Washington,	Mar. 26, 1917,	Smoking,	10 85	June 9,	F. E. Towers,		$ 25
Buffington,	May 19, 1917,	Burning rubbish,	10 85	July 19,	Charles Dearmy,		10 85
Grant,	April 17, 1917,	Engine,	9 75	Aug. 28,	Savan Coal Co.,	9 75	
						$12 45	$11 10
Jefferson:							
Warsaw,	May 3, 1917,	Engine,	2 10	June 29,	P. & S. R. R.,	$2 10	
Warsaw,	May 14, 1917,	Engine,	60	June 29,	P. & S. R. R.,	60	
						$2 70	
Juniata:							
Tuscarora,	Mar. 31, 1917,						
Lack, (3)	April 3, 1917,	Engine,	2 50	April 25,	Tuscarora Val. R. R.,	$2 50	
Walker,	April 12, 1917,	Burning brush,	6 30	May 19,	Jonathan Fogleman,	6 30	
Tuscarora,	May 17, 1917,	Engine,	3 55	May 24,	Tuscarora Val. R. R.,	3 55	
Tuscarora,	April 13, 1917,	Engine,	75	June 19,	Tuscarora Val. R. R.,		$ 75
Walker,	May 18, 1917,	Burning brush,	3 30	July 14,	C. C. Book & Son,		3 30
						$12 35	$4 05

(c) Damage to State land, $40.00.

Lackawanna:							
Jefferson,	Dec. 6, 1917,	Engine,	15 80	May 18,	Erie R. R.,		$15 80
Lancaster:							
East Earl and Caernarvon,	April 16, 1917,	Engine,	48 73	Sept. 4,	P. R. R.,	$48 73	
East Earl,	April 19, 1917,	Engine,	26 20	Sept. 4,	P. R. R.,	26 20	
						$74 93	
Lebanon:							
Cold Spring,	April 25, 1917,	Engine,	30	Oct. 26,	P. R. R.,	$ 30	
Cold Spring,	May 15, 1917,	Engine,	3 30	Oct. 26,	P. R. R.,	3 30	
Cold Spring,	May 19, 1917,	Engine,	3 00	Oct. 26,	P. R. R.,	3 00	
South Lebanon,	Nov. 16, 1917,	Engine,	3 80	Dec. 6,	C. O. B. Co.,	3 80	
						$10 40	
Luzerne:							
Dorrance,	May 15, 1917,	Burning brush,	2 80	July 13,	Jas. Fenstermacher,	$2 80	
Bear Creek,	May 19, 1917,	Engine,	35 25	Oct. 4,	L. V. R. R.,	35 25	
Dallas,	May 14, 1917,	Engine,	90	Oct. 4,	L. V. R. R.,	.90	
Denison,	Nov. 3, 1916,	Engine,	1 92	Oct. 29,	C. R. R. of N. J.,	1 92	
Denison,	Oct. 12, 1916,	Engine,	2 83	Oct. 29,	C. R. R. of N. J.,	2 83	
Denison,	April 1, 1917,	Engine,	1 20	Oct. 29,	C. R. R. of N. J.,	1 20	
Denison,	April 11, 1917,	Engine,	1 20	Oct. 29,	C. R. R. of N. J.,	1 20	
Denison,	April 11, 1917,	Engine,	1 20	Oct. 29,	C. R. R. of N. J.,	1 20	
Denison,	April 11, 1917,	Engine (drill),	1 50	Dec. 26,	L. V. R. R.,	1 50	
						$48 80	
Lycoming:							
Cogan House,	April 11, 1917,	Burning rubbish,	5 50	May 2,	Fred. Messner,		$5 50
Jackson,	April 11, 1917,	Burning stump,	18 00	May 5,	Gabriel Reed,		18 00
Washington,	April 11, 1917,	Burning brush,	1 86	June 13,	Max Shaffer,	$1 86	
Franklin-Pine,	May 15, 1917,	Burning brush,	20 15	June 14,	Truman Cox,		20 15
Lewis,	April 16, 1917,	Fire for cooking,	14 03	June 26,	Central Pa. Lumber Co. (employes).		14 03
						$1 86	$57 68
McKean:							
Liberty,	April 18, 1917,	Burning grass,	7 95	June 5,	Ralph Linnan,	$7 95	
						$7 95	
Mifflin:							
Wayne,	Mar. 26, 1917,	Burning brush,	18 55	April 20,	Wm. Wilson,		(d)$9 32
Union,	April 25, 1917,	Burning brush,	37 45	June 5,	Christ Byler,	(e)$27 10	
Oliver,	May 18, 1917,	Saw mill,	13 95	July 6,	Ruhl & Watson,		13 95
Oliver,	May 18-19, 1917,	Saw mill,	20 25	Oct. 16,	Ruhl & Watson,	$20 25	
Bratton,	April 11, 1917,	Engine,	16 05	Nov. 5,	P. R. R.,	16 05	
						$63 40	$23 27

(d) Neighbors withdrew claims of $9.23.

(e) $10.35 retained by Forester, added to State Forest Receipts.

Amounts Received in 1917 on Account Forest Fires—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.	Paid to Fire Warden.
Monroe:							
Middle Smithfield,	Sept. 10, 1916,	Engine,	7 75	Mar. 14,	D. V. R. R.,	$7 75	
Coolbaugh,	April 1, 1917,	Engine,	3 40	Aug. 28,	D. L. & W.,	3 40	
Paradise,	April 4, 1917,	Engine,	4 50	Aug. 28,	D. L. & W.,	4 50	
Pocono,	April 17, 1917,	Engine,	4 50	Aug. 28,	D. L. & W.,	4 50	
Ross,	April 19, 1917,	Engine,	12 60	Aug. 23,	L. & N. E.,	12 60	
Coolbaugh,	May 14, 1917,	Engine,	7 05	Aug. 28,	D. L. & W.,	7 05	
Ross,	May 14, 1917,	Engine,	4 05	Aug. 23,	L. & N. E.,	4 05	
Paradise,	May 14, 1917,	Engine,	40 50	Aug. 28,	D. L. & W.,	40 50	
Paradise,	May 15, 1917,	Engine,	48 06	Aug. 28,	D. L. & W.,	48 06	
Pocono, Stroud and Paradise,	May 15, 1917,	Engine,	108 77	Aug. 28,	D. L. & W.,	108 77	
						$236 18	
Northumberland:							
Coal,	April 7, 1917,	Engine,	6 90	May 18,	P. R. R.,	$6 90	
Coal,	April 3, 1917,	Engine,	21 25	June 25,	P. R. R.,	21 25	
Shamokin,	April 1, 1917,	Engine,	13 50	June 25,	P. & R.,	13 50	
Mt. Carmel,	Mar. 27, 1917,	Engine,	1 35	June 25,	P. & R.,	1 35	
Shamokin,	April 4, 1917,	Engine,	6 15	June 25,	P. & R.,	6 15	
Jackson,	Mar. 26, 1917,	Engine,	22 20	June 25,	P. & R.,	22 20	
Little Mahanoy,	Mar. 26, 1917,	Engine,	1 20	June 25,	P. & R.,	1 20	
Little Mahanoy,	Mar. 26, 1917,	Engine,	24 00	June 25,	P. & R.,	24 00	
Zerbe,	April 10, 1917,	Engine,	5 40	June 25,	P. & R.,	5 40	
Rockerfellow,	April 11, 1917,	Engine,	33 80	June 25,	P. & R.,	33 80	
Shamokin,	May 19, 1917,	Burning brush,	5 10	Aug. 6,	Chas. Janaskie,	5 10	
Washington,	May 14, 1917,	Engine,	56 62	Oct. 26,	P. & R.,	56 62	
Little Mahanoy,	May 14, 1917,	Engine,	38 25	Oct. 26,	P. & R.,	38 25	
Zerbe,	April 29, 1917,	Engine,	6 30	Oct. 26,	P. & R.,	6 30	
Mt. Carmel,	May 15, 1917,	Engine,	1 80	Oct. 26,	P. & R.,	1 80	
						$243 82	
Perry:							
Buffalo,	May 15, 1917,	Burning brush,	7 70	June 19,	Thomas Radel,		$7 70
Miller,	April 11, 1917,	Burning rubbish,	70 10	Nov. 16,	Jos. Vaughn,	$5 00	
						$5 00	$7 70

Pike:							
Shohola,	May 26, 1917,	Engine,	4 65	July 17,	Erie R. R.,		$4 65
							$4 65
Potter:							
Eulalia,	May 11, 1917,	Engine,	3 00	May 29,	C. & P. A.,		$3 00
Eulalia,	May 14, 1917,	Engine,	4 60	May 29,	C. & P. A.,		4 60
Eulalia,	May 15, 1917,	Engine,	1 90	May 29,	C. & P. A.,		1 90
Eulalia,	May 15, 1917,	Warming fire,	8 85	May 29,	Jas. W. Groves,		8 85
Abbott,	May 15, 1917,	Clearing,	3 25	June 20,	Frank Trautner,		3 25
Eulalia,	Sept. 27, 1917,	Engine,	1 80	Oct. 26,	C. & P. A.,	$1 80	
Eulalia,	Nov. 13, 1917,	Burning stumps,	1 60	Nov. 22,	Joe Baker,		1 60
						$1 80	$23 20
Schuylkill:							
St. Clair Boro. and New Castle,	April 10, 1917,	Engine,	14 40	May 18,	P. R. R.,	$14 40	
Schuylkill,	May 26, 1917,	"Loki",	11 25	June 19,	Maryd Coal Co.,	11 25	
North Manheim,	April 9, 1917,	Engine,	90	June 25,	P. & R.,	90	
Newcastle,	April 22, 1917,	Engine,	36 60	June 25,	P. & R.,	36 60	
Ashland Boro.,	April 11, 1917,	Engine,	3 45	June 25,	P. & R.,	3 45	
Ashland Boro.,	April 11, 1917,	Engine,	4 80	June 25,	P. & R.,	4 80	
Hegins,	April 18, 1916,	Engine,	65 11	Aug. 6,	V. Savage,	65 11	
West Penn,	April 4, 1917,	Engine,	1 20	Sept. 18,	L. V. R. R.,	1 20	
West Penn,	April 10, 1917,	Engine,	1 80	Sept. 18,	L. V. R. R.,	1 80	
West Penn,	April 10, 1917,	Engine,	90	Sept. 18,	L. V. R. R.,	90	
West Penn,	April 11, 1917,	Engine,	30	Sept. 18,	L. V. R. R.,	30	
West Penn,	April 12, 1917,	Engine,	4 20	Sept. 18,	L. V. R. R.,	4 20	
West Penn,	May 11, 1917,	Engine,	45	Sept. 18,	L. V. R. R.,	45	
West Penn,	May 14, 1917,	Engine,	1 65	Sept. 18,	L. V. R. R.,	1 65	
West Penn,	May 25, 1917,	Engine,	1 95	Sept. 18,	L. V. R. R.,	1 95	
Schuylkill,	May 14, 1917,	Engine,	6 50	Oct. 26,	P. & R.,	6 50	
Schuylkill,	May 14, 1917,	Engine,	60	Oct. 26,	P. & R.,	60	
Walker,	May 14, 1917,	Engine,	90	Oct. 26,	P. & R.,	90	
Wayne,	May 15, 1917,	Engine,	16 83	Oct. 26,	P. & R.,	16 83	
South Manheim,	May 3, 1917,	Engine,	8 40	Oct. 26,	P. & R.,	8 40	
West Penn,	Mar. 30, 1917,	Engine,	1 80	Oct. 26,	P. & R.,	1 80	
Butler,	April 29, 1917,	Engine,	2 20	Oct. 26,	P. & R.,	2 20	
Branch,	April 10, 1917,	Engine,	1 20	Oct. 26,	P. & R.,	1 20	
North Manheim,	May 10, 1917,	Engine,	1 20	Oct. 26,	P. & R.,	1 20	
						$188 59	
Snyder:							
Franklin,	April 17, 1917,	Engine,	16 50	May 18,	P. R. R.,	$16 50	
Franklin,	May 14, 1917,	Engine,	15 85	June 30,	P. R. R.,	15 85	
Franklin,	May 11, 1916,	Saw mill,	11 36	Sept. 9,	Geinett & Gemberling,	11 36	
						$43 71	

Amounts Received in 1917 on Account Forest Fires—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.	Paid to Fire Warden.
Somerset:							
Shade,	Dec. 7, 1916,	Burning brush,	2 65	Jan. 3,	M. G. Gindlesperger,	$2 65	
Northampton,	Mar. 29, 1917,	Clearing right of way,	2 05	June 11,	B. & O.,	2 05	
Ogle,	May 16, 1917,	Saw mill,	10 05	June 14,	S. L. Rose,		$10 05
Elk Lick,	May 18, 1917,	Logging engine,	2 48	June 19,	Muncy Lumber Co.,		2 48
Elk Lick,	April 23, 1917,	Logging engine,	2 10	June 28,	Muncy Lumber Co.,		2 10
Shade,	May 15, 1917,	Burning brush,	4 05	June 29,	Grant Wright,	(f)4 10	
Quemahoning,	Mar. 26, 1917,	Engine,	15	Oct. 5,	B. & O.,	15	
Quemahoning,	Mar. 31, 1917,	Engine,	30	Oct. 5,	B. & O.,	30	
Quemahoning,	Mar. 31, 1917,	Engine,	60	Oct. 5,	B. & O.,	60	
Quemahoning,	Mar. 31, 1917,	Engine,	2 85	Oct. 5,	B. & O.,	2 85	
Northampton,	April 1, 1917,	Engine,	5 03	Oct. 5,	B. & O.,	5 03	
Quemahoning,	April 17, 1917,	Engine,	90	Oct. 5,	B. & O.,	90	
Quemahoning,	April 18, 1917,	Engine,	15	Oct. 5,	B. & O.,	15	
Quemahoning,	April 18, 1917,	Engine,	60	Oct. 5,	B. & O.,	60	
Quemahoning,	April 21, 1917,	Engine,	15	Oct. 5,	B. & O.,	15	
Quemahoning,	April 23, 1917,	Engine,	45	Oct. 5,	B. & O.,	45	
Quemahoning,	April 26, 1917,	Engine,	90	Oct. 5,	B. & O.,	90	
Somerset,	April 21, 1917,	Engine,	1 80	Oct. 5,	B. & O.,	1 80	
Addison,	April 22-23, 1917,	Incendiary,		Dec. 3,	Unknown,	(g)5 70	
						$28 38	$14 63
Sullivan:							
Colley,	April 18, 1917,	Burning stump,	14 10	July 30,	Andrew Rusinko,	$14 10	
Colley,	May 27, 1917,	Engine,	7 50	Sept. 18,	L. V. R. R.,	7 50	
Cherry,	May 18, 1917,	Engine,	3 30	Oct. 4,	L. V. R. R.,	3 30	
Cherry,	April 17, 1917,	Engine,	23 25	Oct. 4,	L. V. R. R.,	23 25	
Cherry,	May 15, 1917,	Engine,	13 80	Oct. 4,	L. V. R. R.,	13 80	
Cherry,	May 16, 1917,	Engine,	13 65	Oct. 4,	L. V. R. R.,	13 65	
Cherry,	May 19, 1917,	Engine,	14 70	Oct. 4,	L. V. R. R.,	14 70	
						$90 30	
Tioga:							
Shippen,	May 1, 1916,	Burning brush,	21 73	Aug. 6,	George Decker,	$23 70	
Venango:							
Sugarcreek,	April 16, 1917,	Burning brush,	10 05	June 11,	Adam Vogus,		$10 05

(f) Five cents in stamps returned.
(g) Refund to State Treasurer; 5 men could not be located.

Wayne:							
Paupack,	April 29, 1917,	Burning brush,	22 10	May 23,	Ray Olmstead,		$22 10
Waymart Boro.,	April 4, 1917,	Engine,	9 75	July 9,	Del. & Hudson,	$9 75	
						$9 75	$22 10
Westmoreland:							
Ligonier,	May 18, 1917,	Clearing log yard,	5 78	June 13,	H. B. Johns Lbr. Co.,	(h)$5 82	
Unity,	April 20, 1916,	Saw mill,	8 01	Sept. 11,	Harry Roadman,	(h) 8 01	
Fairfield,	May 14, 1917,	Saw mill,	1 20	Oct. 2,	T. L. Berkey,	(h) 1 20	
Bolivar,	May 1-3, 1916,	Mining engine,	22 60	Oct. 15,	Booth & Flynn,	(h)20 34	
						$34 87	
Wyoming:							
Refund on cost of fire extinction,	1915,			Jan. 18,	H. K. Van Tuyl,	$15 00	
Monroe,	May 14, 1917,	Burning brush,	8 19	July 12,	John Thompson,	8 19	
Noxen,	May 13, 1917.	Engine,	2 10	Oct. 4,	L. V. R. R.,	2 10	
						$25 29	
						$2,253 95	$452 43
Refund on patrolman's salary,				Jan. 1917,	A. W. Bodine,	41 60	
						$2,295 55	

(h) Collected through Justice of Peace.

Claims for Fire Extinction Presented and Later Withdrawn, 1917.

Township.	Date of Fire.	Cost of Extinction.	Date of Withdrawal.	Reason for Withdrawal.
Bedford				
Bedford,	May 11-13, 1916,	$33 05	July 23,	Poverty.
Monroe,	Apr. 17, 1916,	6 33	July 30,	Poverty.
St. Clair,	Apr. 18, 1916,	2 07	July 26,	Out of jurisdiction—Ohio.
Woodbury,	Dec. 7-8, 1916,	20 24	July 20,	Lack of evidence.
Blair				
Greenfield,	Nov. 21, 1916,	3 25	Jan. 12,	Lack of evidence.
Frankstown,	Nov. 3, 1915,	5 03	Mar. 26,	Contract with landowner.
Catharine,	Dec. 6, 1916,	4 15	July 31,	Lack of evidence.
Bradford				
Standing Stone,	Apr. 18, 1917,	17 50	June 5,	Lack of evidence.
Cambria				
W. Taylor,	May 1, 1916,	33 40	Jan. 30,	Poverty.
Cameron				
Gibson,	Mar. 20, 1917,	1 50	Sept. 28,	Co-operation.
Carbon				
East Penn	Apr. 11, 1917,	46 64	July 3,	Lack of evidence.
Clearfield				
Brady,	Apr. 18, 1917,	6 05	June 13,	Lack of evidence.
Graham-Morris,	May 15, 1917,	20 25	June 26,	Poverty.
Clinton				
Chapman,	Oct. 4, 1916,	5 85	Aug. 20,	Lack of evidence.
Leidy,	Oct. 12, 1916,	4 41	Aug. 23,	Lack of evidence.
Dauphin				
Wiconisco,	Apr. 12, 1917,	9 00	Aug. 23,	Lack of evidence.
Fayette				
Wharton,	Mar. 31, 1917,	1 58	April 26,	Assistance at subsequent fire.
Wharton,	Apr. 4, 1917,	53 20	May 21,	Lack of evidence.
Henry Clay,	Oct. 26, 27, 1916,	13 00	Aug. 29,	Lack of evidence.
Fulton				
Todd,	June 3, 1917,	4 44	July 3,	State paid fire warden $1.50.
Bethel,	Apr. 18, 1916,	4 86	Aug. 6,	Lack of evidence.
Huntingdon				
Todd,	Apr. 17, 1917,	17 65	June 5,	Poverty.
Todd,	Apr. 18, 1916,	67 77	July 24,	Lack of evidence.
Todd,	May 12, 1916,	3 42	July 24,	Lack of evidence.
Todd,	Nov. 11, 1916,	3 20	July 24,	Lack of evidence.
Todd,	Nov. 20, 1916,	6 50	July 24,	Lack of evidence.
Indiana				
Pine,	May 18, 1916,	6 38	July 24,	Grass fire.
E. Wheatfield,	May 14, 1916,	63 90	Sept. 13,	Legal status of company.
Luzerne				
Hazle	Apr. 23, 1917,	14 25	June 29,	Co-operation.
Conyngham,	Apr. 18, 1916,	32 30	Aug. 20,	Lack of evidence.
Lycoming				
Pine,	Apr. 17, 1917,	15 80	May 10,	Lack of evidence.
Pine,	Apr. 18, 1917,	8 70	July 23,	Only damaged land owned by selves.
Upper Fairfield,	May 13, 1916,	5 11	July 31,	Poverty.
Franklin,	May 9, 1916,	15 70	July 31,	Lack of evidence.
McKean				
Hamilton,	May 11-14, 1916,	15 73	Sept. 28,	Lack of evidence.
Northampton				
Washington,	Nov. 10, 1917,	6 30	Dec. 26,	Lack of evidence.

Claims for Fire Extinction Presented and Later Withdrawn, 1917.

Township.	Date of Fire.	Cost of Extinction.	Date of Withdrawal.	Reason for Withdrawal.
Potter				
E. Fork.	Apr. 18, 1917,	4 35	May 18,	Co-operation.
Hector.	May 11-14, 1916,	21 65	Aug. 2,	Lack of evidence.
Abbott.	Nov. 2-3, 1916,	6 09	Aug. 2,	Poverty.
Abbott.	May 11, 1916,	73 00	Sept. 28,	Lack of evidence.
Ulysses.	May 14, 1917,	11 80	Sept. 28,	Co-operation.
Keating.	May 16, -1917,	3 70	Sept. 28,	Co-operation.
Wharton.	Apr. 24, 1917,	80	Sept. 28,	Co-operation.
West Branch.	May 16, 1917,	40	Sept. 28,	Co-operation.
Eulalia.	May 17, 1917,	3 18	Sept. 28,	Co-operation.
West Branch.	May 15, 1917,	35 77	Sept. 28,	Co-operation.
Somerset				
Shade.	Apr. 20, 1916	4 75	Jan. 26,	Lack of evidence.
Jefferson.	May 18, 1917,	319 35	Dec. 8,	Lack of evidence.
Sullivan				
Laporte.	Apr. 29, 1917,	21 90	Oct. 18,	Lack of evidence.
Laporte.	May 3, 1917,	7 20	Oct. 18,	Lack of evidence.
Laporte.	May 11, 1917,	7 20	Oct. 18,	Lack of evidence.
Laporte.	May 14, 1917,	10 25	Oct. 18,	Lack of evidence.
Laporte.	May 19, 1917,	27 45	Oct. 18,	Lack of evidence.
Cherry.	May 17, 1917,	4 80	Oct. 18,	Lack of evidence.
Wayne				
Palmyra.	May 12, 1916,	--------	Aug. 28,	Out of jurisdiction—Panama.
Wyoming				
Forkston.	Apr. 25, 1917,	33 90	June 4,	Poverty.
Meshoppen.	Apr. 11, 1917	7 80	June 29,	Poverty.

Bills for Fire Extinction Settled Without Money Passing Through this Bureau, 1917.

Township.	Date of Fire.	Cause.	Date of withdrawal.	Paid by party responsible.	Claims cancelled by fire fighters.
Armstrong Valley,	Mar. 26, 1917,	Burning brush,	April 16,		$5 25
Bedford Napier,	May 2, 1917,	Clearing,	May 25,	$9 26	
Bucks Springfield,	April 11, 1917,	Burning brush,	May 17,		4 65
Cambria Jackson,	May 23, 1917,	Burning leaves,	July 20,		4 20
Centre Snow Shoe,	May 15, 1917,	Burning brush,	July 17,		*3 75
Rush,	May 14, 1917,	Brick works,	May 14,	7 00	
Clearfield Bloom-Penn,	May 14, 1917,	Burning brush,	July 6,		12 60
Columbia Fishing Creek,	May 17, 1917,	Burning brush,	July 6,		8 10
Fayette Dunbar,	Feb. 11, 1917,	Smoking,	April 9,		3 28
Indiana Washington,	Mar. 26, 1917,	Smoking,	June 9,		10 85
Luzerne Plymouth,	May 19-21, 1917,	Burning brush,	May 25(?),		
Lycoming Cogan House,	April 18, 1917,	Burning rubbish,	April 27,	18 10	
Mifflin Wayne,	Mar. 26, 1917,	Burning brush,	April 20,		9 32
Monroe Jackson,	April 7, 1917,	Burning brush,	June 29,	3 15	
Northumberland Mt. Carmel,	April 17, 1917,	Boy 9 years old,	April 17,		(?)
Susquehanna Great Bend,	April 4, 1917,	Burning brush,	May 28,		1 45
Tioga Tioga,	Dec. 6, 1916,	Burning brush,	Feb. 10,	3 50	
Westmoreland Fairfield,	May 19, 1917,	Sawmill engine,	June 18,	24 75	
Wyoming North Branch,	April 23, 1917,	Burning brush,	May 25,	7 75	
				$73 51	$59 70

*Refund.

A summary of the tables shows the following:

Paid into the State Treasury:

Refunded on 1916 patrol service,	$41 60
Refunded on 1916 overdraft by warden,	15 00
Refund on 1917 fire bills,	13 95
Damage to State Forest,	40 00
Bills for fire extinction,	2,185 00
	$2,295 55

Paid to Fire Wardens through this Bureau,	452 43
Paid to State Forester for Forest Receipts,	10 35
Bills settled with wardens directly,	73 51
Claims for fire fighting withdrawn,	59 70
	$2,891 54

Of the amount paid into the State Treasury, $91.00 was credited to the School Fund, and $2,204.55 was credited to the General Fund. Receipts from individuals totaled $1,016.73, and from railroads $1,674.80.

Compared with 1916 items which follow, the above makes a creditable showing:

Paid into State Treasury:		
Bills for extinction,	$242 92	
Damage to State Forest,	35 00	
		277 92
Paid to the wardens through this Bureau,		117 86
Paid to Fire Wardens directly,		90 45
		$486 23

FINANCIAL STATEMENT

Showing classification of bills requisitioned during 1917.

1916 Expenses:		
Extinction bills,	$851 75	
Forester's expenses,	19 68	
Protective Association,	13 39	
		$884 82
1917 Expenses:		
Salary of Chief,	2,499 96	
Expenses of Chief,	274 59	
Salary of Clerk,	700 00	
Expenses of Clerk,	105 53	
Salaries of Stenographers,	511 67	
Stamps and postals,	694 38	
Maps,	3 16	
Badges,	264 01	
Ads—Bell Telephone Directories (lists of wardens),	553 62	
Associations,	1,021 84	

Towers,		820 87	
Legal affairs,		95 93	
Tools,		105 12	
Fire Warden meetings,		361 24	
Oaths of office,		717 72	
Patrol,		*3,544 12	
Expenses of Foresters:			
Railroad fare,	$136 17		
Baggage,	1 10		
Auto,	674 76		
Trolley,	14 45		
Livery,	45 49		
Hotel Ex.,	93 80		
Meals,	101 50		
Lodging,	3 25		
Porter,	1 90		
Postage,	44 14		
Telegraph,	43		
Telephone,	13 70		
Stationery,	2 45		
Expenses,	67		
		1,133 81	
Extinction bills:			
Labor,	$27,052 44		
Transportation,	1,894 34		
Meals,	548 33		
Oaths,	6 80		
Postage,	10 36		
Tools,	30 30		
Telephone,	5 41		
		29,547 98	
			42,955 35
			$43,840 17

Because this statement covers only such bills as were approved during the calendar year, there will be some discrepencies between the figures given in it and those given in other tables which give a complete statement of costs for the year's activities. It shows an increase of expenditures along protective lines, as compared with past years. The principal items of this nature are the printing of lists of wardens in the telephone directories, the purchase of tools, the erection of towers, and the employment of patrolmen. Notwithstanding this advance, the expense for fire extinction is by far the largest

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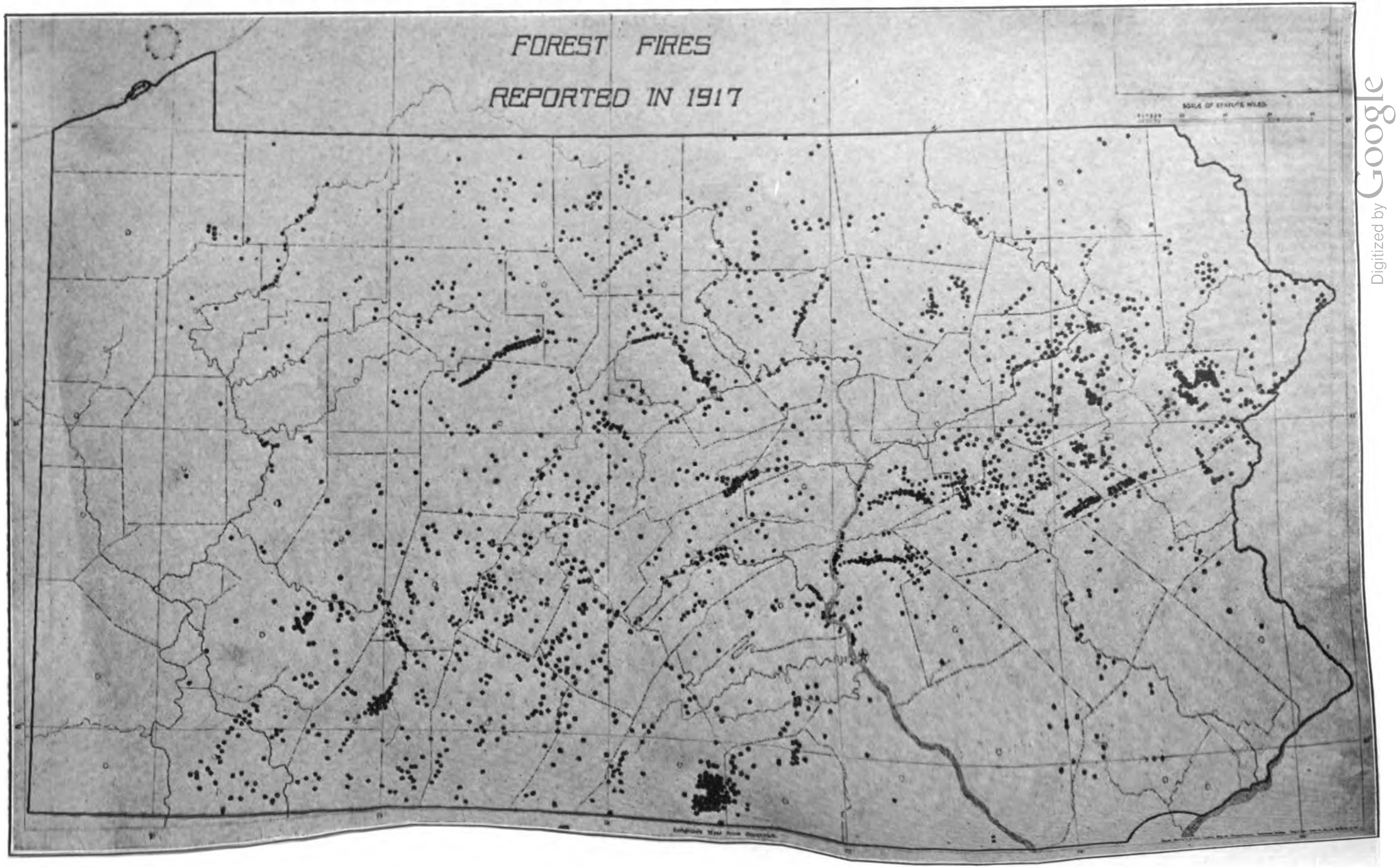
*$33.00 of this amount chargeable to 1918.

single item and should be on the decrease instead of on the increase. The cost of extinction of 1916 fires was only $13,932.60, or an average cost of $13.75 per fire. The fire risk in 1917 was tremendous as compared to that of 1916 as is indicated by the fact that twice as many fires had to be combated. With practically no general improvement in equipment and with a reduced force of wardens the extinction of 1917 fires cost $30,218.24, or an average per fire of $14.48. Considering the fact that the average acreage burned over was about the same as last year and that the rate of wage paid during the fall season was advanced 33⅓% over that prevailing during 1916, it shows that the wardens were at least on the alert and were able to hold their own against staggering odds. What the cost of extinction would have been under the old system, it is hard to estimate but on the basis of fires reported for 1915, it probably would not have been less than $45,000.00.

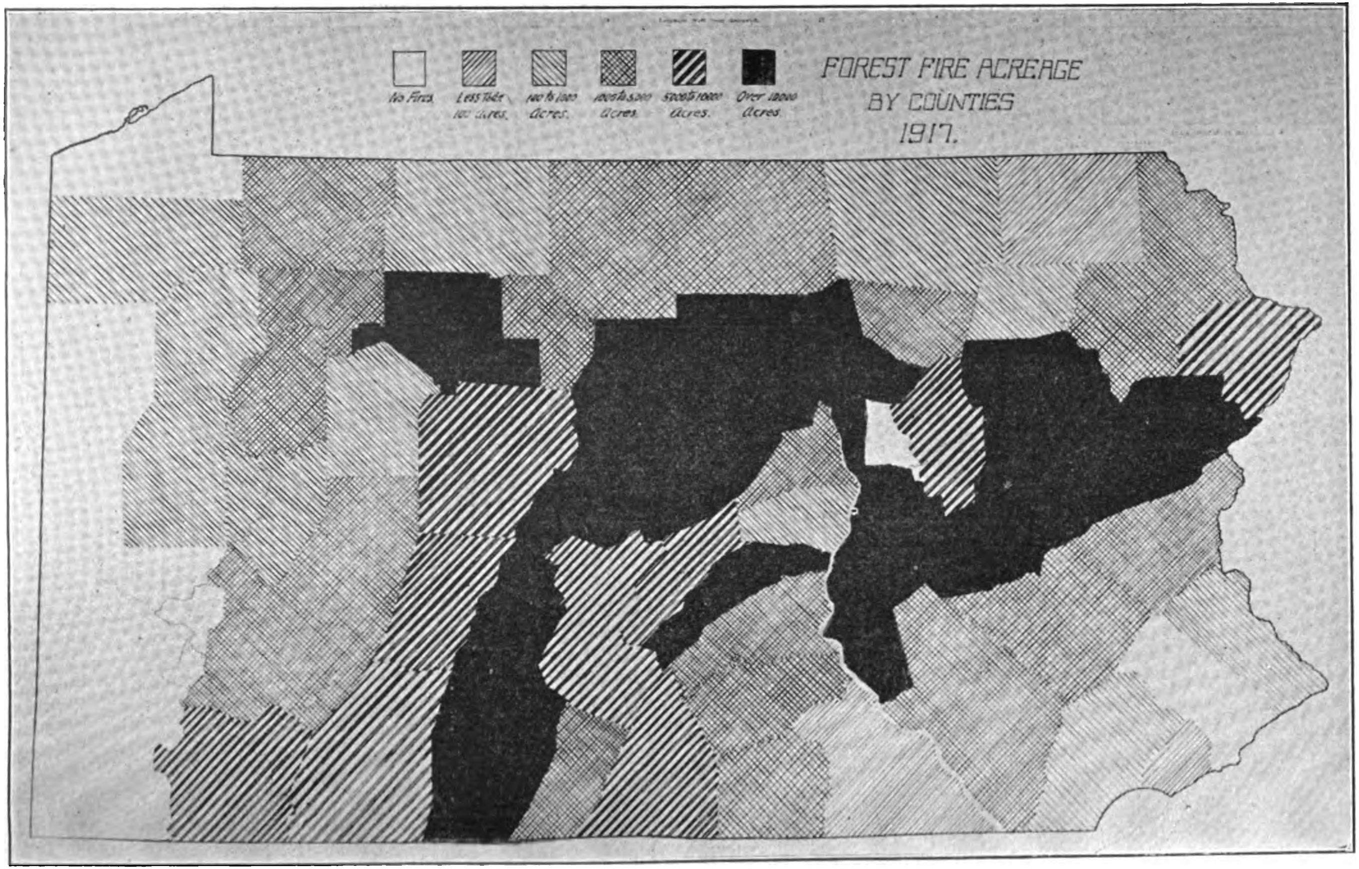
It will also be observed that the total expenditures during 1917 amounted to $43,840.17. The Legislature has failed to provide an appropriation exceeding $45,000.00 for two years until the last session. It can be seen readily how long such an appropriation would last under conditions which existed in 1917. And such conditions are likely to fall upon us at any time. It is the part of wisdom to have on hand an amount which will take care of such emergencies. Nineteen hundred and seventeen was the worst year we have experienced so far. There is no indication that the same kind of season will not occur in 1918 or 1919. As far as the forest is concerned conditions are constantly getting worse instead of better. The only solution to the problem is to prevent fires as far as possible and to speed up on our organization for the extinction of those fires which undoubtedly will occur. But we must have money for protective measures, with a sufficient surplus to take care of any unusual demands for extinction expenses. This State ought not to be satisfied with its forest policy until there is available annually not less than $100,000.00 for protection from forest fire.

Number 1917 Fires by Months.

County.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Adams,		1	2	13	16						4	1	37
Allegheny,													
Armstrong,			5	7	2						3		17
Beaver,													
Bedford,			5	9	16				1		31		62
Berks,			2	9	5						6		22
Blair,			3	20	22			1			10		56
Bradford,	1	1	2	11	4						1		20
Bucks,				2	1						2		5
Butler,					2								2
Cambria,			5	19	33					2	7		66
Cameron,			4	8	4						1		17
Carbon,			1	30	16	1					4		52
Centre,			8	40	31						11		90
Chester,			2	3	3						3		11
Clarion,				1	7								8
Clearfield,			2	23	21			1			2		49
Clinton,			6	43	15						7		71
Columbia,				15	11						8		34
Crawford,				6									6
Cumberland,			1	8	7						5		21
Dauphin,			7	39	24	1					4		75
Delaware,			1										1
Elk,			3	32	18						1		54
Erie,													
Fayette,		1	9	13	21					1	2		47
Forest,				6	6						1		13
Franklin,		1	3	30	33		1				21		89
Fulton,		1		2	2	1		1		1	10		18
Greene,													
Huntingdon,			4	25	24				1	2	13		69
Indiana,			3	9	5						1		18
Jefferson,				5	4								9
Juniata,			8	5	12						6		31
Lackawanna,			3	16	7						3		29
Lancaster,				4	2						2		8
Lawrence,													
Lebanon,			1	3	4						3		11
Lehigh,			1	3	4						2		10
Luzerne,				62	30			1	1		25	2	121
Lycoming,			2	26	22						6		56
McKean,				8	9						4		21
Mercer,													
Mifflin,			7	13	7						7		34
Monroe,			1	56	31					2	20	1	111
Montgomery,													
Montour,													
Northampton,				11	3						7		21
Northumberland,			4	28	13					1	12		58
Perry,			1	22	7						4		34
Philadelphia,													
Pike,				10	9				1	1	5		26
Potter,				29	25				2		1		57
Schuylkill,			8	62	38	1					13		122
Snyder,		1	1	4	2								8
Somerset,			8	24	38						16		86
Sullivan,			2	15	20						2		39
Susquehanna,				3	2						3		8
Tioga,			5	18	8						2		33
Union,			3	4	8	1			2		1		19
Venango,				2	1	1							4
Warren,				10	3						1		14
Washington,													
Wayne,			1	9	7	1					1		19
Westmoreland,			9	8	14					3	6		40
Wyoming,			1	11	7	1							20
York,	1			3	1						3		8
Total,	2	6	143	897	688	8	1	4	8	13	313	4	2,087



FOREST FIRES REPORTED IN 1917


FOREST FIRE ACREAGE
BY COUNTIES
1917.
No Fires.
Less than 100 acres.
100 to 1000 Acres.
1000 to 5000 Acres.
5000 to 10000 Acres.
Over 10000 Acres.

Summary by Cause, Area, Damage, and Cost of Extinction of Forest Fires, 1917.

County.	Causes.								Total.	Area—acres.	Total damage.	Cost of Extinction.	
	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.				From fire fund.	To individuals.
Adams,	12		16	1				8	37	2,654.37	$5,683	$470 90	$208 30
Allegheny,													
Armstrong,	7	2		2				6	17	670.50	3,017	112 65	22 60
Beaver,													
Bedford,	7	6	9	7	3		1	29	62	12,497.75	18,681	1,237 53	62 69
Berks,	9	3	1	2	1		1	5	22	1,067.25	3,465	236 36	24 55
Blair,	18	4	3	5	4		2	20	56	14,077.56	27,138	1,184 16	600 85
Bradford,	5	7	1	3				4	20	756.50	4,741	157 79	72 50
Bucks,		1		2				2	5	412.01	333	34 01	6 00
Butler,		2							2	520.00			48 20
Cambria,	15	11	1	6	1		1	31	66	5,846.90	4,914	609 64	104 60
Cameron,	9	1						7	17	1,981.00	2,123	152 50	94 58
Carbon,	20	6	2	2				22	52	10,300.25	22,642	768 02	228 69
Centre,	50	5	3	4	1		4	23	90	16,586.92	36,838	1,401 84	535 88
Chester,	6	1		2				2	11	318.00	7,592	60 12	38 75
Clarion,	4	1		1				2	8	2,257.00	75	188 25	10 25
Clearfield,	19	6		5		1	3	15	49	6,472.50	16,887	636 50	170 75
Clinton,	33	5	1	9			5	18	71	12,385.35	14,722	577 26	396 52
Columbia,	10	6		2			3	13	34	5,392.75	8,144	371 48	95 25
Crawford,		3						3	6	175.00	320		2 60
Cumberland,	9	1	2	3				6	21	3,581.75	6,086	444 60	48 60
Dauphin,	30		6	8	1		2	28	75	21,393.33	25,473	1,637 26	476 75
Delaware,								1	1	55.00			
Elk,	36	1	1	2				14	54	18,880.35	14,745	801 92	230 70
Erie,													
Fayette,	8	6		5	1		4	23	47	6,078.75	13,027	677 09	263 73
Forest,	11							2	13	1,267.00	800	44 60	825 00
Franklin,	7	3	45	8	3			23	89	6,733.11	7,244	1,253 10	698 02
Fulton,		1	2	6		1	1	7	18	1,433.00	1,538	413 80	21 01
Greene,													
Huntingdon,	21	6	3	7	1		4	27	69	7,382.11	15,762	709 64	402 44
Indiana,	3	2		3	1		2	7	18	1,424.50	2,301	144 28	33 00
Jefferson,	3	1					1	4	9	538.75	2,604	109 60	2 80
Juniata,	8	2	2	4	6			9	31	13,136.50	71,902	837 24	39 55
Lackawanna,	13			1				15	29	3,417.00	3,271	379 86	37 80
Lancaster,	5	1		1				1	8	1,604.00	10,070	140 65	75
Lawrence,													
Lebanon,	4	1		2			1	3	11	2,592.25	3,325	116 23	27 75
Lehigh,	1	1	1	2				5	10	3,532.00	11,715	387 00	1 35
Luzerne,	21	7	2	12			2	77	121	21,537.00	35,375	1,461 86	69 80
Lycoming,	18	9	2	7	4			16	56	21,359.50	58,919	2,297 65	855 38
McKean,	13	1	3					4	21	900.50	743	95 41	67 78
Mercer,													
Mifflin,	14	5	1	3	2			9	34	8,158.76	16,792	902 09	209 58
Monroe,	67	6	5	5			2	26	111	10,066.38	13,384	1,162 47	447 15
Montgomery,													
Montour,													
Northampton,	4	1	2	1				13	21	2,460.75	3,420	212 37	96 91
Northumberland	24	2	2	6			3	21	58	13,720.51	24,200	640 17	652 11
Perry,	15	5		3	2		1	8	34	4,338.61	7,352	1,071 73	243 70
Philadelphia,													
Pike,	2	3	1	7				13	26	7,407.00	5,760	440 10	90 55
Potter,	21	11	1	10				14	57	1,509.70	3,231	291 45	154 63
Schuylkill,	49	3	1	6	1		6	56	122	13,360.75	27,655	1,422 32	100 31
Snyder,	3							5	8	366.50	684	115 27	20 60
Somerset,	43	2	2	5	7		1	26	86	9,905.20	26,910	1,330 89	166 73
Sullivan,	19	3	1	3				13	39	2,555.00	1,354	393 80	103 50
Susquehanna,	1	1		3				3	8	46.75	70	22 90	3 55
Tioga,	16	1	1	7	2			6	33	2,804.00	3,606	371 43	96 75
Union,	9		2	6		1		1	19	3,403.57	4,001	567 55	29 15
Venango,	2	1						1	4	993.00	6,025	35 35	13 65
Warren,	8	1		1				4	14	1,017.00	1,290	70 43	37 95
Washington,													
Wayne,	3	3	1	1				11	19	1,724.00	2,685	302 08	29 15
Westmoreland,	13	2		8	4		2	11	40	3,109.50	6,983	357 66	87 95
Wyoming,	5	8		1				6	20	982.00	1,380	223 29	30 30
York,	3	2	1					2	8	84.00	125	44 75	7 65
Total,	756	173	127	200	45	3	52	731	2,087	310,339.	$619,182	$30,218 09	$8,721 58

Extinction Expenses Approved in 1917 for 1917 Fires.

County.	Labor.	Transportation.	Meals.	Telephone.	Affidavit.	Tools.	Postage.
Adams,	$388 71	$61 77	$20 40				$0 02
Armstrong,	111 23	1 00			$0 42		
Bedford,	1,191 20	32 40	12 50	$0 20	.25		08
Berks,	211 64	21 00	3 20				52
Blair,	1,141 96	41 90					30
Bradford,	119 34	36 70	1 00		25		50
Bucks,	27 76	5 00	1 25				
Cambria,	551 69	53 95	1 00	05		2 35	60
Cameron,	139 80	11 80		90			
Carbon,	725 90	36 30	5 33		25		24
Centre,	1,297 86	73 34	30 64				
Chester,	55 15	4 22			75		
Clarion,	150 20	28 65	9 40				
Clearfield,	590 25	30 30	15 58			35	02
Clinton,	541 03	24 52	11 21			50	
Columbia,	352 35	18 30			75		08
Cumberland,	404 40	14 20	25 35	65			
Dauphin,	1,569 11	62 70	3 05	1 00	25		1 15
Elk,	710 80	133 64	43 03	20	25	4 00	
Fayette,	639 35	26 55	9 83	10			1 26
Forest,	41 10	3 50					
Franklin,	1,057 75	147 93	47 42				
Fulton,	398 95	5 50	9 35				
Huntingdon,	640 84	49 70	18 23	40	25		22
Indiana,	131 78	12 50					
Jefferson,	105 60	4 00					
Juniata,	800 85	28 15	8 24				
Lackawanna,	354 91	19 55	5 40				
Lancaster,	120 15	20 50					
Lebanon,	115 98				25		
Lehigh,	376 81	5 00	5 28				
Luzerne,	1,365 80	90 65	2 30	50	1 05		1 47
Lycoming,	1,981 63	179 06	126 96	65	25	9 10	
McKean,	80 45	14 96					
Mifflin,	818 23	49 36	34 50				
Monroe,	963 44	187 75	5 25			6 00	03
Northampton,	191 82	16 30	4 25				
Northumberland,	633 97	3 70	2 25		25		
Perry,	1,007 28	38 45	26 00				
Pike,	365 38	68 92	5 80				
Potter,	234 30	52 70	4 20		25		
Schuylkill,	1,374 72	41 10	5 10		50		90
Snyder,	106 02	9 25					
Somerset,	1,256 73	58 75	13 45	20	25		1 51
Sullivan,	377 25	13 00	3 30		25		
Susquehanna,	22 90						
Tioga,	345 10	17 90	7 25				1 18
Union,	473 15	79 30	10 90	1 20		3 00	
Venango,	27 75	7 00					60
Warren,	63 53	6 30	60				
Wayne,	266 33	34 75	1 00				
Westmoreland,	314 08	23 35	19 90		33		
Wyoming,	218 29	5 00					
York,	42 20	2 30			25		
Total,	$27,594 89	$2,014 42	$550 70	$6 05	$7 05	$25 30	$11 58

Grand total, $30,218.99.

Area, Damage, and Cost of Extinction of Forest Fires in 1915, 1916, and 1917.

County.	Number.			Area.			Damage.			Cost of Extinction.		
	1915	1916	1917	1915	1916	1917	1915	1916	1917	1915	1916	1917
Adams,	4	9	37	1,540	526	2,654.37	$5,985	$1,606	$5,683	$76 22	$107 65	$470 90
Allegheny,												
Armstrong,	9	10	17	877	222	670.5	2,350	917	3,017	83 50	38 10	112 65
Beaver,												
Bedford,	39	46	62	6,449	4,906	12,497.75	11,049	4,703	18,681	969 49	483 16	1,237 53
Berks,	18	27	22	3,255	2,225	1,067.25	24,850	5,112	3,465	497 81	305 71	236 36
Blair,	18	41	56	3,353	17,977	14,077.56	6,688	19,743	27,138	317 82	636 69	1,184 16
Bradford,	7	3	20	958	47	756.50	2,227	32	4,741	64 10	17 00	157 79
Bucks,	2	4	5	65	35	412.01	650	74	333	5 75	20 05	34 01
Butler,		1	2		60	520.00					9 85	
Cambria,	17	31	66	2,253	614	5,846.90	2,313	3,233	4,914	351 82	139 75	609 64
Cameron,	21	15	17	4,169	8,207	1,981.00	6,265	7,445	2,123	327 87	196 55	152 50
Carbon,	38	33	52	6,696	7,466	10,300.25	42,007	10,429	22,642	628 02	376 73	768 02
Centre,	85	47	90	28,120	9,143	16,586.92	52,527	8,161	36,838	2,288 00	1,556 20	1,401 84
Chester,	2	5	11	8	454	318.00	153	4,686	7,592	43 43	54 02	60 12
Clarion,	9	2	8	727	7	2,257.00	774	26	75	279 90	13 35	188 25
Clearfield,	57	14	49	14,707	3,482	6,472.50	19,724	1,071	16,887	1,477 65	177 95	636 59
Clinton,	59	56	71	70,064	6,701	12,385.35	93,047	23,330	14,722	2,247 62	529 40	577 26
Columbia,	8	8	34	3,433	3,248	5,392.75	12,885	17,725	8,144	248 55	187 88	371 48
Crawford,		2	6		752	175.00			320		4 75	
Cumberland,	23	20	21	19,046	1,517	3,581.75	117,575	2,019	6,086	811 46	180 01	444 60
Dauphin,	57	20	75	13,516	3,604	21,393.33	25,045	6,466	25,473	1,127 28	307 94	1,637 26
Delaware,						55.00						
Elk,	14	14	54	4,223	1,380	18,889.35	6,055	2,792	14,745	872 46	581 56	891 92
Erie,												
Fayette,	17	26	47	2,344	3,908	6,078.75	3,423	7,247	13,027	207 06	316 10	677 09
Forest,	1	8	13	2,266	337	1,267.00		25	800	77 65	23 30	44 60
Franklin,	65	75	89	6,257	1,526	6,733.11	7,875	2,219	7,244	1,045 13	541 90	1,258 10
Fulton,	8	18	18	4,682	1,200	1,433.00	6,466	2,362	1,538	312 88	276 05	413 80
Greene,												
Huntingdon,	35	34	69	10,767	7,610	7,382.11	36,088	10,118	15,762	812 15	963 41	709 64
Indiana,	1	5	18	136	457	1,424.50	304	3,400	2,801	29 95	81 70	144 28
Jefferson,	19	2	9	041	16	538.75	3,514		2,664	211 90	6 88	109 60
Juniata,	6	16	31	403	3,692	13,136.50	690	6,061	71,902	120 51	206 76	837 24
Lackawanna,	16	12	29	1,218	3,050	3,417.00	1,263	3,410	3,271	139 20	233 68	379 86
Lancaster,	6	2	8	2,257	350	1,604.00	7,010	2,525	10,070	198 68	63 81	140 65
Lawrence,	2			10			207			13 05		

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
	ARMSTRONG COUNTY.						
Mar. 26	Cowanshannock,	12	90	Unknown,	$7 55	$2 85	Rairigh.
26	Valley,	7	30	Burning brush,		5 25	Rosenberger.
29	Mahoning,	1.5		P. S. & N. R. R.,	5 18		Shoemaker.
31	Kiskiminetas,	200	200	Burning brush,	15 09		Fitzgerald.
31	Kiskiminetas,	25		Boys,	3 83		Fitzgerald.
April 11	Mahoning,	75	150	Unknown,	8 55		Shoemaker.
19	Rayburn,	100	1,000	Unknown,	9 15		Rosenberger.
10	Madison,	35	300	P. R. R.,	5 25		Lorenz.
25	Madison,	25	512	Unknown,	15 60		Lorenz.
25	Rayburn,	40	25	Smoker,	4 50		Rosenberger.
26	Madison,	5	30	P. R. R. (?),		10 00	
28	Madison,	30	250	P. R. R.,	7 50		Lorenz.
May 11	Mahoning,	1	5	P. S. & N. R. R.,	3 00		Shoemaker.
15	Madison,	4	25	P. R. R.,	1 65	1 50	Lorenz.
15	E. Franklin,	?		False alarm,			Rosenberger.
Nov. 8	Valley,	50	100	Unknown,	15 30		Rosenberger.
10	Valley,	50	100	Unknown,	4 80		Rosenberger.
14	Madison,	10	200	P. R. R.,	5 70	3 00	Paine.
		670.5	$3,017		$112 65	$22 60	
	BEDFORD COUNTY.						
Mar. 26	Liberty,	3		H. & B. T. R. R.,		$3 00	
26	Broad Top,	8	10	Unknown,	$5 95		Ford.
26	Broad Top,			Incendiary,	1 15		Ford.
30-4/1	Broad Top (a),	1,200	200	H. & B. T. R. R.,	18 30		Tenley.
31	Snake Spring,	3	10	Unknown,	2 10		Grimes.
April 1	Londonderry,	5	40	Unknown,			Miller.
3-4	Londonderry,	50	25	Unknown,	8 55		Mays.
11	Londonderry,	2	10	Unknown,	1 27		Miller.
11	King,	1		P. R. R.,			Stambaugh.
16	Napier,	15	10	Unknown,	6 86	50	Miller.
19	Broad Top (a),	18		Incendiary,	1 20	24	Lytle.
22-23	Londonderry,	61	30	Unknown,	24 00		Mays.
23-24	Union,	40	40	Unknown,			Feathers.
28	Londonderry,	8	75	Unknown,	3 30		Miller.
May 2	King,	6	22	Sawmill,		3 84	Mock.
2	Napier,	6	24	Clearing,		13 06	Miller.

(a) See Huntingdon county.

	3	Snake Spring,	70	25	Clearing.	9 23	3 00	Grimes.
	3	Woodbury,	60	94	Unknown,	12 05		Brumbaugh.
	3	Bloomfield,	200	900	Unknown,	52 05		Snyder.
	3	Woodbury,	100	200	Unknown,	18 95	3 90	McIlnay.
	3	S. Woodbury,	30	10	Unknown,	4 05		Richey.
	11-13	Bedford,	500	1,100	Burning brush,	33 05		Heming.
	15-18	King,	15	40	Sawmill,		7 20	Mock.
	15-18	Bed.-Har.-Napier,	4,000	5,800	Burning brush,	164 17	13 50	Agnew.
	15-20	Bed.-Snake Spring,	500	200	Burning brush,	187 80	1 50	Miller.
	16-17	Broad Top,	30	30	Incendiary,	18 90		Tenley.
	18-22	Londonderry,	750	4,100	Unknown,	52 55		Miller.
	18	King,	20	50	Unknown,	7 05		Mock.
	19-20	E. St. Clair,	160	120	Burning brush,	12 62		Stambaugh.
	19-20	E. St. Clair,	30	300	Unknown,	20 55	1 35	Hoover.
Sept.	17-18	Southampton,	75	50	Unknown,	17 40		Smith.
Nov.	4	Londonderry,	300	600	Unknown,	29 30		Miller.
	5	Woodbury,	.5		Hunters,	2 40		Brumbaugh.
	6	Bedford,		200	Burning building,	3 70		Agnew.
	6	Juniata,	4		Hunters,	6 40		Clites.
	7	Liberty,	1		H. & B. T. M. R. R.,	45		Weaver.
	8	Liberty,	7	5	H. & B. T. M. R. R.,	2 95		
	8-9	Woodbury,	120	200	Unknown,	18 00		Brumbaugh.
	9-10	Broad Top,	400	250	Incendiary,	28 50		Tenley.
	9-10	Cumb. Valley,	800	800	Unknown,	32 60		Anderson.
	10-11	Broad Top,	100	75	Unknown,	34 60		Ford.
	10-11	E. Providence (b),	125	25	Bee tree,	26 68	1 00	Simpson.
	10-11	Hopewell,	400	500	Hunters,	62 20		McIlnay.
	10-11	Lincoln,	30	50	Unknown,	8 40		Ling.
	11	Broad Top (b),	80	400	Unknown,	4 80		Poor.
	11-12	Union,	60	140	Incendiary,	9 70	1 00	Feathers.
	10-12	Broad Top,	500	500	H. & B. T. R. R.,	57 00		Tenley.
	13	Union,	.5	4	Incendiary,	1 40		Feathers.
	15-16	E. Providence (b),	100	75	Unknown,	22 60		Ritchley.
	15-17	Cumb. Valley,	600	500	Unknown,	54 00		Anderson.
	16-18	Bed.-Coler.,	275	200	Incendiary,	25 10		Heming.
	17-19	Broad Top,	50	50	Hunters,	10 40		Ford.
	17	Snake Spring,	20	10	Unknown,	4 90		Miller.
	17-18	Union,	26	62	Incendiary,	9 50		Feathers.
	17	Colerain,	300	200	Hunters,	34 85		Houser.
	18	Bed.-Coler.,	60	100	Unknown,	18 00		Agnew.
	13-19	Kimmel-Greenf.,	30	50	Unknown,	10 00		Finnegan.
	20	Bedford,	75	50	Incendiary,	3 60	40	Heming.
	20	E. Providence,	2	5	Burning leaves,	3 80	5 00	Smith.
	20	Napier,	50	100	Hunters,	19 60	4 20	Agnew.
	25	Woodbury,	.75		Unknown,	1 00		Brumbaugh.
	10-11	Broad Top,	20	15	H. & B. T. M. R. R.,	13 00		Byers.
			12,497.75	$18,681		$1,237 53	$62 60	

(b) See Fulton county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		BERKS COUNTY.						
Mar.	20	Cumru,	3	$75	Burning brush,		$3 30	Kohout.
	30	Ontelaunee,	200	50	P. R. R.,	$13 58	1 25	Fisher.
April	3	Reading Boro.,	30	60	Boys,		1 50	McNeal.
	3	Robeson,	40	50	Unknown,	10 05	2 25	Evans.
	4	Union,	40	100	Quarry engine,	4 80		Church.
	4	Reading Boro.,	10	5	Unknown,		1 20	McNeal.
	10	Reading Boro.,	3	2	Unknown,		1 20	McNeal.
	11	Bethel,	116	500	Burning brush,	26 36	2 25	Meck.
	25	Albany,	1	3	P. & R. R. R.,	75	1 25	Snyder.
	28	Greenwich-Albany,	6	60	P. & R. R. R.,	5 17		Altenderfer.
	28	Robeson,	80		Unknown,	12 60		Church.
May	12	Robeson,	42.5	120	P. & R. R. R. (?),	12 13	3 75	Evans.
	14	Ruscombmanor,	150	800	Burning brush,	55 45	90	Noll.
	15	Ruscomb.-Richm.,	40	1,030	P. & R.,	30 77		Noll.
	19	Greenwich-Albany,	7	80	P. & R.,	6 20		Altenderfer.
	25	Rockland,	1		Stave mill,	6 15		Ruppert.
Nov.	6	Bethel,	150	150	Incendiary,	8 55		Meek.
	7	Ontelaunee,	.25		P. & R. R. R.,		20	McNeal.
	9	Robeson,	17.5	20	P. & R. R. R.,	1 70	70	Evans.
	10-11	Tilden,	100	300	Unknown,	21 00		Bailey.
	10	Maiden Creek,	20	10	P. & R. R. R.,		4 80	McNeal.
	10	Richmond,	10	50	Hunters,	21 10		Schlegel.
			1,067.25	$3,465		$236 36	$24 55	
		BLAIR COUNTY.						
Mar.	26	Catharine,	150		Sawmill,	$2 10	$9 50	Hyle.
	31-4/1	Huston,	450	1,000	Unknown,	11 63		Acker.
	31	Antis,	12	8	Unknown,	4 90		Keller.
April	4	Antis,	800	160	Unknown,	18 70		Keller.
	4	Woodbury,	20	200	Unknown,	1 20		Hyle.
	11	Woodbury,	8	25	P. R. R.,	3 00		Hyle.
	12	Logan,	7	15	Boys,	2 40	90	Goetz.
	16	Snyder,	.25		P. R. R.,			Morton.
	16	Snyder,	.06		P. R. R.,			Morton.

	17	Frankstown,	30	30	Unknown,	7 80		Goetz.
	17	Frankstown,	40	20	Unknown,	6 45		Goetz.
	18	Antis,	25	6	Burning brush,	4 95	5 00	Keller.
	18	Taylor,	150		P. R. R.,	4 05		Adams.
	19	Taylor,	50		Boys,	1 50		Adams.
	19	Freedom,	75	112	Burning brush,	7 20		Malon.
	21	Logan,	15		Unknown,	1 95		Yost.
	22	Frankstown,	25	125	Unknown,	5 30	90	Degenhardt.
	22	Logan,	20	50	Smoker (?),	10 02		Schaal.
	25	Logan,	75	300	P. R. R. (?),	5 10	2 25	Goetz.
	25	Antis,	25	6	P. R. R.,	6 30		Keller.
	27	Juniata,	12		Burning brush,	4 00		Ritchey.
	28	Antis,	75	19	Unknown,	8 50		Keller.
	28	Allegheny,	150	450	P. R. R.,	10 50	18 00	Chamberlin.
May	4	Logan,			False alarm,	2 10		Degenhardt.
	13	Logan,	100	300	Unknown,	8 40		Yost.
	14	Woodbury,	800	8,000	Unknown,	158 42		Hyle.
	14	Logan,	1		P. R. R. (?),	1 65	1 00	Winters.
	14-16	Frankstown,	300		Quarry engine,	12 01		Ritz.
	15-18	Blair-Frank.,	2,000		P. R. R.,	87 90	55 00	Ritz.
	15-16	Juniata,	40	250	P. R. R.,	7 80		Chamberlin.
	15 17	Allegheny,	300	3,740	P. R. R.,	45 60	60 00	Chamberlin.
	15-16	Taylor,	100		Sawmill,	16 95	12 00	Adams.
	15 16	Juniata,	200	3,550	P. R. R.,	32 50	18 00	Myers.
	15-16	Snyder,	150	800	P. R. R.,	7 50		Friday.
	15-18	Logan,	2,200	1,250	Sawmill,	69 15	212 00	Schaal.
	16-23	Frank.-Cath.- Tyr.,	1,800	600	Unknown,	318 00	33 00	Ludwig.
	16 17	Logan,	300	100	Unknown,	36 90		Yost.
	16-17	Taylor,	50		Sawmill,	14 85	12 00	Adams.
	16-17	Snyder,	60	1,000	P. R. R.,	7 50		Friday.
	17-19	Logan,	500		P. R. R. (?),	12 00		Ramer.
	18 19	Taylor,	150	350	Unknown,	19 10		Adams.
	18	Juniata,	90	220	Burning stumps,	7 20		Ritchey.
	18-20	Allegh.-Jun.,	900	2,772	P. R. R.,	22 95	87 00	Chamberlin.
	19	Greenfield,			False alarm,	8 10		Lingenfelter.
	20	Logan,	50	200	Unknown,	7 20		Yost.
	26	Juniata,	3	12	P. R. R.,	1 35		Chamberlin.
	26	Huston,	60	100	Unknown,	10 20		Acker.
Aug.	5	Logan,	4	4	Unknown,	3 15		Sharp.
Nov.	7	Antis,	20	4	Unknown,	7 60		Keller.
	9-10	Greenfield,	375		Incendiary,	25 90		Lingenfelter.
	9-10	Frankstown,	80	200	Dinkey (?),	12 03		Chamberlin.
	10	Logan,	120	600	Unknown,	19 10	1 80	Yost.
	15	Greenfield,	.25		Unknown,	1 20	75	Dively.
	11-12	Allegheny,	70	140	P. R. R.,	3 00	11 75	Chamberlin.
	15	Greenfield,	25	25	Incendiary,	16 40		Lingenfelter.
	17-18	Woodbury,	10	100	Hunters,	13 60		Hyle.
	17-20	Logan,	900	300	Hunters,	33 30	60 00	Schaal.
	19-20	Greenfield,	80		Incendiary,	6 00		Lingenfelter.
			14,077.56	$27,138		$1,184 16	$600 85	

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		BRADFORD COUNTY.						
Jan.	8	Wyalusing,	25	$10	Unknown,	$2 35	$1 00	Whispell.
Feb.	19-20	LeRoy,	2	1,252	Incendiary,	25 05		Montgomery.
Mar.	24-26	Wyalusing,	185	2,000	L. V. R. R. (?),	18 70	35 10	Whispell.
	25	Standing Stone,	2	50	L. V. R. R.,	8 10	1 75	Whispell.
April	3	Wyalusing,	24	575	L. V. R. R.,	10 80	4 05	Whispell.
	16	Granville,	20	20	Burning brush,	14 47	1 20	Montgomery.
	18	Terry,	40	80	Burning grass,	7 64	6 00	Terry.
	18-19	Monroe,	75	100	Burning grass,	9 15	2 25	Montgomery.
	18	Standing Stone,	50	50	Burning brush,	7 50	90	Elliott.
	18	Wyalusing,	30	148	Burning debris,	4 06	4 50	Elliott.
	19	Wyalusing,	8	80	Burning brush,	3 60	10 00	Elliott.
	22	Wyalusing,	8	53	Unknown,	6 70		Elliott.
	25	Wyalusing,	12	30	L. V. R. R.,	1 50	2 25	Whispell.
	25	Barclay,	100	150	Fishermen (?),	5 05		Montgomery.
	29	LeRoy,	100	50	S. & N. Y. (?),	5 95		Montgomery.
May	2	Overton,	20	10	Unknown,	4 50		Benjamin.
	5	Granville,	.5	8	Smoker,			Montgomery.
	14	Canton-Armenia,	20	40	Burning brush,	9 47	2 70	Chapman.
	17	Albany,	30	30	Unknown,	3 80		Benjamin.
Nov.	16	Armenia,	5	10	Hunters,	4 40	80	
			756.5	$4,741		$157 79	$72 50	
		BUCKS COUNTY.						
April	11	Milford,	.01		Boys,			Buck.
	11	Springfield,	35	$300	Burning brush,		$6 00	Fretz.
May	19	Springfield,	300		Unknown,	$27 41		Loux.
Nov.	7	Buckingham,	75	8	Hunters,	5 55		Ewers.
	27	E. Rockhill,	2	25	Unknown,	1 05		Detwiler.
			412.01	$333		$34 01	$6 00	
		BUTLER COUNTY.						
May	15-16	Parker,	450		Burning brush,	$48 20		Butler.
	19	Butler,	70		Clearing land,			Martin.
			520			$48 20		

		CAMBRIA COUNTY.						
Mar.	16	Upper Yoder,	1		Burning brush,	$2 55	$ 45	Woller.
	26	White,	80	$20	Unknown,	5 70		Nool.
	26	Richland,	3		Unknown,			Cooper.
	31	Lower Yoder,	1		Burning brush,	3 60	30	Weller.
	31	Lower Yoder,	.75		Boys,	90		Weller.
April	3	Lower Yoder,	25	125	Unknown,	11 60	1 20	Weller.
	3	Richland,	1		B. & O. R. R.,	30		Cooper.
	3	Black Lick,	40		Unknown,	8 10		Gotschall.
	10	Black Lick,	6		Unknown,	2 70		Gottschall.
	10	Richland,	10	50	B. & O. R. R.,	90		Cooper.
	16	East Taylor,	26	50	Unknown,	7 30	2 00	Weller.
	16	Richland,	3		B. & O. R. R.,			Cooper.
	17	Barr,	8	50	Unknown,	9 00		Farabaugh.
	17	Black Lick,	7		P. R. R. (?),	6 75		Gotschall.
	18	Black Lick,	.01		Unknown,	90		Gotschall.
	22-23	Clearfield,	90	32	Unknown,	9 02		Lynch.
	22-23	West Taylor (a),	85	425	P. R. R.,	29 05		Weller.
	22	Stony Creek,	5	5	B. & O. R. R.,	1 98	1 20	Ludwig.
	22	Upper Yoder,	1		Unknown,	90		Ludwig.
	22	Susquehanna,	42.5	100	Boys,	10 65		Connor.
	22	Cresson,	3		P. R. R.,	1 20		Freidhof.
	23	Cresson-Wash.,	56	38	Unknown,	12 90		Cassidy.
	26	Richland,	5	2	B. & O. R. R.,	2 25		Cooper.
	28	Cresson,	?		Burning brush,	1 50		Freidhof.
May	3	West Taylor,	5	25	Unknown,	2 10	1 05	Weller.
	6	Barr,	6	50	Unknown,	4 35		Farabaugh.
	13	Portage,	.13		Burning stumps,	90		Burke.
	14	Gallitzin,	30		Unknown,	7 30		Ramer.
	14	Susquehanna,	200	300	Unknown,	6 90		Conner.
	14	Black Lick,	200		Unknown,	13 50		Gotschall.
	14	Dean,	17.5		Brick Co. dinkey,	60		Dougherty.
	15	Jackson,	2		Burning brush,	90	27 00	Diehl.
	15	Dean,	.01		A. & N. R. R.,	30		Dougherty.
	15	Barr,	12	75	Unknown,	4 80		Farabaugh.
	15	Elder,	2		Unknown,	7 50		Cosgrove.
	15	Lower Yoder,	70	200	Sawmill,	25 75	3 60	Weller.
	15	Adams (b),	2,500	321	Unknown,	26 30	6 75	Miller.
	15	Black Lick,	1.5	1	P. R. R. (?),	1 80		Diehl.
	15	Lower Yoder,	5	25	P. R. R.,	10 30	3 00	Weller.
	15	Croyle,	15	405	Burning brush,	17 85	11 00	Settlemyer.
	15-16	Jackson,	335	670	Burning brush,	31 05	9 00	Diehl.
	15-16	Cambria,	75	208	Burning brush,	29 60	9 30	Jones.
	16	Susquehanna,	100	150	Unknown,	7 50		Conner.
	17-19	Clearfield,	275		Burning brush,	72 43		Lynch.
	17-20	Chest (c),	150	75	Fisherman,	17 65		Kline.
	18-19	Clearfield,	30	180	Unknown,	16 65		Smithbower.
	18-19	Cambria,	480	530	Unknown,	7 35		Ludwig.

(a) See Indiana county. (b) See Somerset county. (c) See Clearfield county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
18	Black Lick,	200	200	Unknown,	4 60	12 00	Rager.
18	Jackson,	24		Unknown,	12 60	8 75	Diehl.
19-22	Chest,	150	200	P. R. R.,	40 10		Cosgrove and Gill.
19	Dean,	12.5		Unknown,			Dougherty.
19-20	Portage,	150	150	Unknown,	50 46		Burke.
19	Dean,	.5		A. N. R. R.,			Dougherty.
20-22	Dean,	2.5	10	Unknown,	12 85		Lynch.
21	Portage,	?		Unknown,	90		Burke.
21	Upper Yoder,	.25	1	Unknown,	1 00	1 80	Ludwig.
23	Jackson,	12	12	Burning leaves,		7 20	Fresh.
Oct. 14	Middle Taylor,	2.5		Boys,	2 10	1 00	Weller.
18	Adams,	200		P. R. R.,	1 80		Baumgarden.
Nov. 5	Curson,	10		Incendiary,	2 50		Freidhof.
6	Adams,	.75		P. R. R.,	90		Baumgarden.
10	Portage,	5	1	Burning brush,	90	1 40	Burke.
13-14	Cresson-Gal.,	50		Unknown,	8 40		Friedhof.
18	Portage,	4.5	5	Unknown,	11 10		Burke.
20	Lower Yoder,	27	120	Smokers,	16 40		Weller.
20	W. Carroltown,	35	103	P. R. R.,	90	1 60	Hartzog.
		5,846.90	$4,914		$609 64	$104 60	
	CAMERON COUNTY.						
Mar. 20	Gibson,	30		B. & S. R. R.,	$1 50		Nyce.
26	Gibson,	2		P. R. R.,	1 85		Nyce.
26-27	Gibson,	200	$100	Unknown,	3 00	$15 00	Nyce.
26-27	Gibson,	75	50	B. & S. R. R.,	9 90	3 60	Ryon.
April 9	Lumber,	100	200	P. R. R.,	7 20	15 00	Tanner.
11-12	Portage,	6	18	Unknown,	7 95	2 48	Evans.
11	Gibson,	70	35	P. R. R.,		29 30	Ryon.
16-18	Lumber,	200	140	Unknown,	21 51	6 80	Evans.
17-18	Lumber,	90	135	P. R. R.,	26 34	6 00	Evans.
18-19	Lumber,	500	1,050	Unknown,	37 65		Tanner.
18-19	Shippen,	40	60	P. R. R.,	6 93	6 75	Evans.
25-26	Shippen,	75	75	P. R. R.,	6 45		Evans.

May	16-17	Shippen,	150	150	Unknown,	3 00		Evans.
	17	Shippen,	20	20	Burning brush,	3 09	3 85	Evans.
	17	Gibson,	3		P. R. R.,			Nyce.
	31-6/1	Lumber,	120	90	Unknown,	2 73	5 80	Evans.
Nov.	14-15	Gibson,	300		Unknown,	13 90		Nyce.
			1,961	$2,128		$152 50	$94 58	
		CARBON COUNTY.						
Mar.	29	East Penn,	1	$3	L. V. R. R.,	$ 30		Kemmerer.
April	3	L. Towamensing,	50	500	Unknown,	50 05		Peters.
	3-4	Packer,	100		L. V. R. R.,	13 50		Neumuller.
	4	Mauch Chunk,	4		Unknown,	4 44		Grover.
	8	East Penn,	1	3	L. V. R. R.,	45		Kemmerer.
	8	East Penn,	.25	1	L. V. R. R.,	90		Kemmerer.
	10	L. Towamensing,	60	600	Unknown,	15 15		Peters.
	10	East Penn,	2	6	L. V. R. R.,	1 13	$1 05	Kemmerer.
	11-12	East Penn,	4	20	L. V. R. R.,	1 50		Kemmerer.
	11	Mauch Chunk,	4		Unknown,	16 20		Grover.
	11	L. Towamensing,	30	300	Unknown,	17 61		Peters.
	11	East Penn,	30	120	L. V. R. R.,	12 15	3 60	Kemmerer.
	11-12	East Penn (a),	640	2,640	Burning brush,	49 64	90	Kemmerer.
	12	Lausanne,	350	700	Unknown,	15 00		Wiener.
	14-15	East Penn,	400	1,200	L. V. R. R.,	33 16		Kemmerer.
	14	East Penn,	2	4	L. V. R. R.,	1 28		Kemmerer.
	15	Mauch Chunk,	5		Unknown,	1 35		Grover.
	15	Mauch Chunk,	3		Burning brush,	90		Grover.
	15	Mauch Chunk,	4		Unknown,	1 50	1 20	Grover.
	16	East Penn,	30	110	L. V. R. R.,	9 41	2 70	Kemmerer.
	16	Lehigh-Penn For.,	300		Unknown,		47 40	Neumuller.
	16-17	Kidder,	300	150	Unknown,	7 50		Grover.
	17	East Penn,	1	2	L. & N. E. R. R.,	90	80	Kemmerer.
	18-19	Mauch Chunk,	250		Unknown,	20 70	55 00	Grover.
	18	Mauch Chunk,	42	125	Unknown,	21 29		Neumuller.
	18	Mauch Chunk,	855	3,000	Burning rubbish,	63 00		Boyer.
	18	Mauch Chunk,	500	500	Unknown,	24 70		Neeb.
	19	Kidder,	1,000	500	Unknown,	13 80	1 95	Gower.
	20	East Penn,	4	8	L. V. R. R.,	60		Kemmerer.
	25	Mauch Chunk,	3		Unknown,	2 85		Grover.
	28	Mauch Chunk,	2		Unknown,	3 23		Grover.
May	13	Mahoning,	63	200	Incendiary,		23 09	Boyer.
	13	Packer,	15	15	L. V. R. R.,	2 25		Schwalm.
	14-19	East Penn (a),	1,000	4,000	L. V. R. R.,	71 11	11 97	Kemmerer.
	14	Mauch Chunk,	2		Unknown,	7 60		Miller.
	14-15	Packer-Banks,	300	2,000	L. V. R. R.,	19 13		Eroh.
	15	M. Chunk-Frank.,	2,000	4,000	Burning brush,	107 07		Boyer.
	15	Packer,	4	40	Incendiary,	4 25		Eroh.
	16	Mauch Chunk,	10		Unknown,	8 85		Grover.

(a) See Lehigh county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
16-18	Mahoning,	150	1,100	Burning brush,			Strobeck.
17-19	Mauch Chunk,	1,000		Unknown,	40 05		Miller.
17	Mahoning,	20	100	L. V. R. R.,	6 15	1 20	Boyer.
17-18	Packer-Banks,	200	200	Unknown,	6 05		Eroh.
19-20	L. Towamensing,	79	1,000	Burning weeds,		77 83	Peters.
19-20	Packer,	35	20	L. V. R. R.,	1 50		Schwalm.
20	Mahoning,	10	75	Boys,	8 00		Boyer.
26	Packer,	250		L. V. R. R.,	17 95		Schwalm.
June 4-5	Packer,	100	100	L. V. R. R.,	22 25		Schwalm.
Nov. 7	Packer,	48		Engine (?) R. R.,	4 00		Schwalm.
8	Towamensing,	15	200	Unknown,	13 24		Neeb.
15	Packer,	20		Hunters,	1 50		Schwalm.
18	Franklin,	2	100	Unknown,	22 90		Neeb.
		10,300.25	$22,642		$768 02	$228 69	
	CENTRE COUNTY.						
Mar. 25	Boggs,	40	$45	P. R. R.,	$16 50		Reese.
25	Liberty,	1.5		P. R. R.,	1 35	$1 00	Coder.
26	Curtin,	320	32	Brick Co. engine,	19 00	4 20	Sheeler.
27	Half Moon,	350	330	P. R. R.,	18 60		Eves.
26	Haines,	1		P. R. R.,			Meek.
26	Snow Shoe,	50	5	P. R. R.,		5 55	Sheeler.
26	Huston,	60	435	P. R. R.,	13 55	18 00	Mattern-Woodring.
30	Haines,	8		Unknown,			Meek.
April 3	Ferguson-Half Moon,	300		Unknown,			
4	Penn,	?		Unknown,			Meek.
8	Rush,	90	90	Smoker,	9 65		Hess and Kelley.
10	Snow Shoe,	120	30	P. R. R.,		4 50	Sheeler.
11-12	Curtin (c),	50	41	Brick Co. engine,		1 00	Sheeler.
11	Boggs,	25	15	P. R. R.,	1 80		Reese.
11	Miles,	12	10	Unknown,	4 15	1 55	Wolfe.
11	Ferguson,	400	200	P. R. R.,	36 80		Reed.
11	North,	20		P. R. R.,	4 05		Woodring.
13	Snow Shoe-Burnside,	200	185	Unknown,	27 65	8 50	Sheeler.

(c) See Clinton county.

	16	Burnside,	75	50	Sawmill,	9 15		Sankey.
	16	Taylor,	25	50	Unknown,	6 00		Newman.
	16	Taylor,	40	50	Unknown,	6 45		Newman.
	16	Burnside,	400	250	For pasture,	26 20	20 00	Sankey.
	16	North,	15	10	P. R. R.,	2 70		Woodring.
	16	Union,	1	10	P. R. R.,	60	60	Hall.
	17	Taylor,			False alarm,	75		Newman.
	17	Rush,	75	50	Unknown,	3 35		Sheeler.
	17	Union,	1.5	6	P. R. R.,	60		Hall.
	18	Burnside,			False alarm,	30		Meeker.
	18	Taylor-Worth,	50	100	Unknown,	90	5 50	Newman.
	18	Rush,	75	50	Unknown,	10 20		Hoover.
	18	Rush,	120	120	P. R. R.,	7 05		Hess.
	18-19	Rush,	100	75	Unknown,	12 00		Pfoutz.
	18	Snow Shoe,	150	60	P. R. R.,	13 50	80	Reese.
	18-19	Snow Shoe,	300	100	P. R. R.,		1 20	Sheeler.
	19	Snow Shoe,	2	5	P. R. R.,		2 50	Sheeler.
	22	Snow Shoe,	45	45	Unknown,	12 40	7 60	McCartney.
	23	Rush,	75	50	P. R. R.,			Hess.
	23	Boggs,	.12		Unknown,			Sheeler.
	25	Burnside,			False alarm,	53		Meeker.
	25	Curtin,	40	10	Burning brush,		10 50	Weaver.
	25	Snow Shoe,	75	50	N. Y. C. R. R.,	6 00	2 25	Sheeler.
	25	Curtin-Snow Shoe,	400	150	N. Y. C. R. R.,		12 70	Sheeler.
	28	Boggs,	60	50	P. R. R.,	12 00		Reese.
	28	Liberty,	5	25	Unknown,	9 60		Shay.
	28	Penn,	?		P. R. R.,			Kerstetter.
	28	Haines,	?		P. R. R.,			Kerstetter.
	29	Burnside,	35	5	Unknown,			Dougherty.
May	3	Taylor,	7		P. R. R.,	60	1 75	Woodring.
	3	Snow Shoe,	25	58	Coal Co. engine,	4 20	2 60	Sheeler.
	11	Curtin,	20	120	N. Y. C. R. R.,			Sheeler.
	13	North,	6		P. R. R.,	1 50	1 20	Woodring.
	14	Snow Shoe,	230	300	P. R. R.,	7 35	28 78	Sheeler.
	14	Rush,	100	50	P. R. R.,	7 50	50 00	Pfoutz.
	14	Patten,	700	715	P. R. R.,	18 90	5 00	Thompson.
	14	Rush,	30		Brick Co. engine,		7 00	McCord.
	14-19	Rush, Taylor, Snyder,	3,000	1,500	P. R. R.,	221 20		Pfoutz, Hoover, Newman.
	14	Ferguson,	150	75	P. R. R.,	12 20	4 50	Reed.
	14	Penn,	?		P. R. R.,		30	Kerstetter.
	15-16	Snow Shoe,	500	1,500	P. R. R.,	11 30	126 40	Sheeler.
	15	Snow Shoe,	10	20	Burning brush,	3 75	1 80	Sheeler.
	15	Burnside,			False alarm,	1 20		Meeker.
	15-13	Taylor,	300	425	P. R. R.,	9 20	17 00	Woodring.
	15	Snow Shoe,	10	10	Unknown,		2 80	Sheeler.
	16	Taylor,	50	200	Unknown,	8 70		Newman.
	16-18	Worth,	400	200	Burning grass,	61 10		Kelley.
	16-17	Half Moon,	400	1,411	P. R. R.,	32 70	9 00	Eves.
	17-20	Snow Shoe-Union,	1,700	1,200	Boys,	87 75	58 25	Sheeler-Reese.
	17-20	Liberty-Marion,	850	780	P. R. R.,	94 05		Shay-Coder.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	17-19	Haines,	90	180	P. R. R.,	60 07	48 00	Libby.
	17-21	Liberty-Marion,	1,200	3,000	P. R. R.,	240 68		Strunk and Holmes.
	17	Snow Shoe,	40	40	Unknown,	1 80		McCartney.
May	17-18	Patten,	1,520	20,000	B. C. R. R.,	60 35	25 00	Thompson and Reed.
	19	Half Moon,	250	812	Unknown,	16 80	5 50	Eves.
	20	Rush,	.25			1 00		McCord.
	25	Curtin,	40	10	Burning brush,		10 50	Weaver.
	25-26	Boggs,	150	75	P. R. R.,	16 50		Reese.
	26	Patton,	3	2	B. C. R. R.,	90		Thompson.
Nov.	6	College,	3	3	Unknown,	7 40	3 60	Wasson.
	7	Haines,	2.5	5	P. R. R.,			Detz.
	8	Harris,	.5	1	Hunters,		1 35	Leech.
	10	Penn,	500	1,000	Unknown,	78 27		Detz.
	14	Haines,	30	60	P. R. R.,	88	4 00	Detz.
	16	Haines,	10	20	P. R. R.,	5 10	7 00	Libby.
	17-18	Gregg,	30	210	Incendiary,	21 75	3 80	Detz.
	17	Gregg,	20	60	Incendiary,	7 76	1 35	Detz.
	16-17	Union,	.5	5	Hunter,	4 00	5 25	Hall.
	18	Gregg,	2	2	Incendiary,	1 60	80	Detz.
	26	Gregg,	.05		P. R. R.,	40	30	Detz.
			16,586.92	$36,838		$1,401 84	$535 88	
		CHESTER COUNTY.						
Mar.	25	Valley,	30	$200	P. R. R.,	$6 05		Manuel.
	30	West Whiteland,	15	6,000	P. R. R.,	1 15	$35 00	Dague.
April	3	W. Brandywine,	16	100	P. R. R.,			McWilliams.
	4	Warwick,	6	25	P. R. R.,			Wood.
	8	Tredyffrin,	6		Burning brush,			
May	11	S. Coventry,	4	60	Unknown,	3 00		Favinger.
	14	E. Whiteland,	14		P. R. R.,	2 40	75	Brubaker.
	27	Sadsbury,	15		Unknown,	9 75		Heines.
Nov.	10	Honeybrook, W. Coln.,	50		Hunters,	10 25		Carroll.
	10	S. Coventry,	155	1,207	Hunters,	27 52	3 00	Favinger.
	15	Brandywine,	7		R. R. engine,			Carroll.
			318	$7,592		$60 12	$38 75	

		CLARION COUNTY.						
April	24	Clarion,	45		Unknown,	$4 05	$1 75	Wagner.
May	14	Elk,	450		B. & O. R. R.,	5 70		Wagner.
	14	Beaver,	50		M. & L. S. R. R.,	7 65		Wagner.
	14-15	**Farmington**,	50	$75	Unknown,	9 90	1 50	Lyons.
	15	Paint,	1,000		B. & O. R. R.,	11 25		Wagner.
	16	Paint,	300		B. & O. R. R.,	4 20		Wagner.
	16-17	Farmington,	72		Burning brush,	13 20	2 00	Lyons.
	17-18	Farmington,	290		Tourists,	132 30	5 00	Lyons.
			2,257	$75		$188 25	$10 25	
		CLEARFIELD COUNTY.						
Mar.	25	Covington,	150	$75	N. Y. C. R. R.,			Horning.
	26	Covington,	100	50	N. Y. C. R. R.,			Horning.
April	10	Huston,	3	2	P. R. R.,		$ 80	Kirk.
	11	Huston,	1.5	30	P. R. R.,	$3 15	3 05	Kirk.
	11	Huston,	4	6	P. R. R.,	4 20	1 60	Kirk.
	11-12	Karthaus,	25	13	Unknown,		1 80	Horning.
	12	Cooper,	175	100	Unknown,	15 00		Hartle.
	12	Huston,	10	15	P. R. R.,		1 20	Kirk.
	16	Morris,	75	50	N. Y. C. R. R.,	10 50		Sarowy.
	17	Huston,	.5	1	P. R. R.,		80	Kirk.
	17	Huston,	2	5	P. R. R.,		80	Kirk.
	17	Huston,	1	1	P. R. R.,		80	Kirk.
	17	Huston,	15	8	Children,	5 40	2 00	Kirk.
	17	Knox,	4		Mining engine,	5 20		Stott.
	17-18	Pike,	69	125	Unknown,	13 50		Anderson.
	17-18	Boggs,	40	500	Unknown,	13 80	4 00	Shugarts.
	18	Huston,	10	15	P. R. R.,	2 25	2 00	Kirk.
	18	Chester Hill,	17.5		P. R. R.,	1 82	2 00	Cowperthwaite.
	18-19	Brady,	16.5	55	Burning rubbish,	6 05	1 50	Wingert.
	18-19	Chest,	200	100	Unknown,	10 70		Kline.
	22	Lawrence,	10	5	Boys,	11 65	60	Goss.
	25	Lawrence,	200	603	N. Y. C. R. R.,	3 00	15 00	Shugarts.
	25	Burnside,	300	3,000	N. Y. C. R. R.,	21 80		Stauffer.
	25	Huston,	5	3	P. R. R.,			Kirk.
	28	Beccaria,	35		Clearing,	7 80	45	Giles.
May	5-6	Sandy,	20	10	Unknown,	6 60		Kirk.
	8	Goshen,	120	1,500	Unknown,	11 10		Livergood.
	11	Huston,	30	30	P. R. R.,		6 40	Kirk.
	13-15	Morris,	200	150	Unknown,	18 75		Sarowy.
	14	Pike,	195	1,075	Brick yard dinkey,	5 40	10 00	Goss.
	14-15	Chest,	15	250	Clearing land,		17 90	McGarvey.
	14-15	Decatur,	30	90	Fireclay engine,	8 55		Kephart.
	14-15	Bloom & Penn,	18.5	500	Burning brush,		12 60	Woods.
	15-18	Knox,	500	2,000	Unknown,	33 10	17 15	Stott.
	15-17	Morris,	100	70	Boys,	20 25		Sarowy.
	15-19	Huston,	700	1,124	Clearing land,	148 45	8 50	Kirk.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
15	Knox,	45	256	Burning old hay,		13 00	Stott.
15-20	Huston,	500	1,500	P. R. R.,	79 35	19 00	Kirk.
16	Penn,	13.5	100	Unknown,	6 15		Woods.
17	Pike,	25	250	B. R. & P.,		10 00	Goss.
17	Pike,	50	625	P. R. R.,	6 50	10 00	Goss.
16-19	Penn,	400	530	Unknown,	42 45		Danvir.
18-20	Chest (a),	2,000	2,000	Fisherman,	101 78		Kline.
19	Karthaus,	.5		Unknown,	75	1 00	Horning.
19	Burnside Boro.,	1	25		5 10		Stauffer.
27	Covington,	10	5	Unknown,	6 00		Horning.
Aug. 4	Karthaus,	10	20	Lightning,		4 20	Horning.
Nov. 6	Goshen,	15	8	Hunters,		1 10	Buck.
6-7	Goshen,	10	10	Unknown,		1 50	Liegey.
		6,472.5	$16,887		$636 50	$170 75	
	CLINTON COUNTY.						
Mar. 22	Chapman,	.25		G. & P. R. R.,			Critchley.
22	Grugan,	.25		P. R. R.,			Powers.
25	Colebrook,	200	$2,012	P. R. R.,	$4 35		Young.
26	Noyes,	50	75	P. R. R.,	8 10	$5 00	Mansfield.
26	Grugan,	4	5	P. R. R.,	1 50	4 00	Powers.
31	Chapman,	20	20	Fisherman (?),	3 00		Critchley.
April 4	Lamar,	2	5	C. R. R. of Pa.,	1 20		Barner.
6	Woodward,	40		Brick Co. engine,	10 50	4 20	Reilihan.
8	Noyes,	20	35	Unknown,	3 00	4 00	Kepler.
9	Grugan,	?		P. R. R.,			Powers.
9	Grugan,	1	1	P. R. R.,		2 00	Powers.
9	Grugan,	?		P. R. R.,			Powers.
9-13	Wood.-Coleb.,	1,000	8,000	Brick Co. engine,	31 20	25 00	Young.
10	Colebrook,	95	500	P. R. R.,	1 50	6 50	Young.
10	Colebrook,	95	100	P. R. R.,	1 50	5 00	Young.
10-11	Colebrook,	1	500	Unknown,		2 70	Young.
10-11	Noyes-Chapman,	150	150	Boys (?),		2 50	Dutlinger.
10	Grugan,	1.5	1	N. Y. C. R. R.,	15	1 50	Powers.
11	Colebrook,	50	200	P. R. R.,	8 00	2 00	Young.
11-12	Beech Creek (b),	50	40	Brick Co. engine,		1 00	Winklebleck.

	11-14	Beech Creek,	1,500	500	Unknown,	20 70	2 70	Glossner.
	11	Colebrook,	2		P. R. R.,	1 80	1 80	Powers.
	11	Colebrook,	50	150	P. R. R. (?).		35 00	Powers.
	11	Lamar,	100		C. R. R of Pa.,	2 25		Karchner.
	11-12	Lamar,	200	500	C. R. R. cf Pa.,	11 70		Barner.
	12-13	Leidy,	600	500	Unknown,	22 95	5 80	Muller.
	12	Mill Hall,	?		Burning buildings,	90		Karchner.
	12	Grugan,	5	6	N. Y. C. R. R.,	15	2 00	Powers.
	13-15	Grugan,	83	51	P. R. R.,	2 10	53 00	Powers.
	13	Grugan,	15	20	Unknown,		5 00	Powers.
	13	Grugan.	20	30	P. R. R. (?),		12 60	Powers.
	17	Gallagher,	30		Burning brush,	10 20	2 00	Gotschall.
	17	Pine Creek,	15	150	Burning brush,	2 94	1 00	Rich.
	17-18	Leidy,	150	50	Clearing land,	9 45	9 30	Muller.
	18	Castanea,	45		Burning brush,	7 14		Harvey.
	18-19	Leidy,	275	150	Unknown,	6 60		Muller.
	18-19	Grugan,	45	50	P. R. R.,		11 00	Powers.
	18-19	Leidy-Noyes,	75	100	Unknown,	10 95		Mansfield.
	22	Castanea,	45		Unknown,	6 15	2 00	Harvey.
	22	Noyes,	85	100	P. R. R.,	9 15	25 00	Mansfield.
	22	Chapman,	10	10	P. R. R.,			Critchley.
	23-24	Noyes,	10	50	Boys (?),	2 10	2 00	Dutlinger.
	24	Leidy,	75	50	Unknown,	8 25	3 20	Muller.
	24-25	Leidy,	1,100	250	Unknown,	15 90	7 20	Muller.
	28-29	Chapman,	50	50	Boys,	22 20	3 20	Critchley.
	28-29	Bald Eagle,	200	415	N. Y. C. R. R.,	17 25	9 00	Karchner.
	28-29	Chapman,	10	10	G. & P. R. R. (?),			Critchley.
	28-29	Chapman,	10	10	Fishermen (?),	3 25	90	Neefe.
	29-30	Noyes,	80	100	P. R. R.,	8 70	1 50	Kepler.
May	4	Chapman,	5	5	P. R. R.,		1 00	Critchley.
	11-14	Leidy,	250	200	Burning brush,	13 35	17 00	Muller.
	12	Leidy,	35	30	Unknown,	4 35		Muller.
	12-13	Leidy,	175	200	Unknown,	18 50	5 50	Mansfield.
	14	Logan,	75	200	Unknown,	36 00	1 00	Hogentogler.
	14-15	Leidy,	200	175	Unknown,	9 90	3 00	Muller.
	14-17	Leidy-Chapman,	3,300	1,500	Fishermen (?),	29 00	22 50	Muller.
	15	Noyes,	200	1,000	P. R. R.,	23 10	20 00	Mansfield.
	15	Noyes,	.25	5	P. R. R.,		1 00	Mansfield.
	15-17	Leidy,	550	150	Unknown,	37 11	3 50	Muller.
	17	Gallagher,	.1	1	Unknown,			Neefe.
	17-19	Leidy,	200	150	Unknown,	14 25		Muller.
	18	Lamar,	30	100	Road tractor,		13 00	Hogentogler.
	19	Grugan,	20	20	P. R. R.,	45	2 50	Powers.
	27	Bald Eagle,	20		Unknown,	7 05	1 00	Kirby.
Nov.	9-10	Noyes,	100	100	P. R. R.,		9 00	Dutlinger.
	9-10	Noyes,	200	225	Incendiary (?),	11 00	6 72	Dutlinger.
	10	Grugan,	40	50	R. R.	2 20	12 80	Dutlinger.
	12-13	Chapman,	25	25	Hunters,	2 00	1 40	Dutlinger.

(a) See Cambria county.
(a) See Centre county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	14	Noyes,	35	35	P. R. R. (?),		2 80	Dutlinger.
	15	Leidy,	10	5	Boys,	1 42		Muller.
	15-16	Crawford,	250	600	Hunters,	95 80	12 00	Metzger.
			12,385.35	$14,722		$577 26	$396 52	
		COLUMBIA COUNTY.						
April	1	Greenwood,	.5	$25	Birch distillery,	$3 47	$4 00	Parker.
	3	Cunningham,	2		L. V. R. R. (?),	3 60		Wightman.
	7	Beaver,	4	16	P. & R.,			Krapp.
	10	Madison,	35	175	S. B. & R. R.,	12 75	6 00	Eves.
	9-10	Beaver,	700	700	P. & R.,	9 00	2 25	Krapp.
	10-11	Catawissa,	150	1,000	P. & R.,	9 35	8 00	Brobst.
	10-11	Beaver,	200	800	Unknown,	10 50		Krapp.
	11	Roaring Creek,	50	600	Unknown,	7 20		Craig.
	11	Roaring Creek (a),	800	200	Unknown,	20 80		Shoup.
	11	Beaver,	200	200	P. & R.,	12 70	18 00	Krapp.
	12	Cunningham,	50		Unknown,	7 45		Wightman.
	18	Fishing Creek,	135	800	P. & S. R. R.,	23 45	8 25	Wenner.
	19	Jackson,	2	100	Boys smoking,	3 65	90	Remley.
	25-26	Mt. Carmel,	450		Unknown,	16 80		Smith.
	29	Fishing Creek,	10		Unknown,	2 25	4 50	Wenner.
May	11	Locust,	10	220	Unknown,	6 60		Craig.
	14	Cunningham,	10		Unknown,	9 00		Wightman.
	14-15	Beaver,	10	200	Burning brush,		8 40	Boone.
	16	Sugarloaf,	35	510	Burning brush,	40 70	1 35	Blaine.
	16	Pine,	1	40	Burning brush,	8 55	4 20	Kisler.
	17	Fishing Creek,	5.5	28	Burning brush,		13 40	Wenner.
	17	Beaver,	2	100	Burning brush,		5 80	Boone.
	18-19	Cunningham,	30		Unknown,	11 10		Wightman.
	19	Centre,	9	30	Unknown,	8 10		Delay.
	19-20	Beaver,	35	1,000	Burning brush,	20 25		Krapp.
	20	Cunningham,	80		Unknown,	6 75		Wightman.
Nov.	8	Cunningham,	4		L. V. Coal Co.,	4 50		Smith.
	8	Roaring Creek (a),	2,000	1,200	Unknown,	81 40		Craig.
	10	Cunningham,	2		L. V. C. Co.,	2 00		Smith.
	16	Main,	20		Hunters,			Bauman.

	17-18	Cunningham,	.5		L. V. R. R.,	2 00		Wightman.
	18	Cunningham,	150		Unknown,	14 40		Smith.
	18-19	Beaver,	200	200	P. & R. R. R.,	12 10	10 20	Krapp.
	20	Cunningham,	.25		L. V. R. R.,	1 06		Wightman.
			5,392.75	$8,144		$371 48	$95 25	
		CRAWFORD COUNTY.						
April	18	Oil Creek,	50		Unknown,			Langdon.
	18	Troy,	50	$200	Unknown,		$ 90	Langdon.
	18	Steuben,	30	120	Unknown,		90	Langdon.
	18	Oil Creek,	10		Burning brush,		30	Langdon.
	18	Oil Creek,	5		Burning rubbish,		80	Langdon.
	18	Oil Creek,	30		Burning brush,		40	Langdon.
			175	$320			$2 60	
		CUMBERLAND COUNTY.						
Mar.	19	Lower Mifflin,	50	$25	Unknown,	$2 71		Stum.
Apr.	1	S. Middleton,	.5		P. & R. R. R.,			Williams.
	3-5	S. Middleton,	400	1,000	P. & R. R. R.,	48 30		Williams.
	4	S. Middleton,	800	1,600	Unknown,	24 15		Sheafer.
	10	S. Middleton,	.5	1	P. & R. R. R.,	60		Williams.
	11	E. Pennsboro,	6	6	Burning brush,		$4 00	Waggoner.
	15	Monroe,	5	20	Children (?),	8 70		Hoover.
	16	S. Middleton,	3	5	P. & R. R. R.,	90		Williams.
	22	Southampton,	.25	1	Unknown,		60	Hancock.
May	13	Penn,	2	5	Unknown,	3 15		Davis.
	14	Cooke,	30	20	P. & R. R. R.,	90	4 00	Williams.
	14-15	Southampton,	100	300	Unknown,	18 00		Brannan.
	14-15	Dickinson,	800	1,200	P. & R. R. R.,	58 80	22 50	Williams.
	15	Cooke-Dickinson,	200	200	P. & R. R. R.,	46 83	17 50	Williams.
	18	Monroe,	20	150	Unknown,	4 90		Hoover.
	19	Monroe,	5	20	Incendiary,	5 80		Hoover.
Nov.	5	S. Middleton,	3	3	Hunters,	1 35		Williams.
	8	S. Middleton,	5	20	P. & R. R. R.,	1 05		Williams.
	10-11	S. Middleton,	650	500	P. & R.,	40 56		Williams.
	16	N. Mountain,	1.5	10	Hunters,	3 17		Brown.
	16-18	Hopewell (b),	500	1,000	Incendiary,	59 73		Rupp.
			3,581.75	$6,086		$444 60	$48 60	
		DAUPHIN COUNTY.						
Mar.	24-25	Williams,	45	$80	P. & R.,	$10 50		Knorr.
	26	Halifax,	4	16	P. R. R.,	1 20	$1 00	Matter.
	30	Washington,	1.5		Unknown,	2 85		Lentz.
	30	Williams,	40	50	Unknown,	10 20		Knorr.

(a) See Schuylkill county.
(b) See Franklin county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	31	Washington,	7	$35	Unknown,	5 10		Lentz.
April	1	Williams,	25	30	Unknown,	36 05		Knorr.
	1	Williams,	30	25	Unknown,	11 10		Knorr.
	1	Washington,	20	60	Smoker,	12 60	3 00	Lubold.
	3	U. Paxton,	3	8	Unknown,	3 47	75	Feldt.
	3	Washington,	12	36	Unknown,	5 85		Lentz.
	4-5	E. Hanover,	200	200	P. & R. R. R.,	22 20		Hampton.
	7	Williams,	12	10	P. & R. (?),	5 10		Knorr.
	9	Wiconisco,	10	12	Unknown,	6 90		Knorr.
	10	Wiconisco,	150	150	P. R. R.,	34 20		Knorr.
	11	U. Paxton,	150	45	P. R. R. (?),	29 25	60 00	Feldt.
	11	Washington,	10	50	Unknown,	9 30		Lubold.
	12	Wiconisco,	30	30	P. & R. R. R.,	9 00		Knorr.
	12	Wiconisco,	25	30	Unknown,	9 30		Knorr.
	12	Wiconisco,	700	1,500	P. R. R.,	8 70		Lubold.
	13	Halifax,	46	92	P. R. R. (?),	25 16		Matter.
	13-14	U. Paxton,	150	150	P. R. R.,	19 42		Kelter.
	14	Elizabethville,	.5	3	P. R. R.,	2 55		Lentz.
	14	Washington,	2	10	Unknown,	1 50		Lentz.
	14	Washington-Wiconisco,	500	1,200	P. R. R.,	17 40	130 00	Lubold.
	14-15	U. Paxton,	50	100	P. R. R.,	8 86		Kelter.
	15	Susquehanna,	2	1	P. R. R. (?),	1 20	60	Shaffner.
	15	Susquehanna,	10	5	P. R. R. (?),	1 50	1 80	Shaffner.
	15	M. Paxton,	20	20	Unknown,	12 30		Lebo.
	15-17	M. Paxton,	100		Unknown,	9 47		Fisher.
	15-18	Susquehanna,	500	1,000	Unknown,	34 97	18 75	Shaffner.
	16	Washington,	25	250	P. R. R.,	13 50		Lubold.
	16-17	U. Paxton,	100	200	P. R. R.,	5 18		Kelter.
	16-19	Williams-Jackson,	1,400	1,200	P. & R. R. R.,	108 45		Knorr.
	16-19	Rush,	1,200	600	Fisherman (?),	108 15		Carl.
	17	Elizabethville,			False alarm,	2 20		Lentz.
	18	Wiconisco,	18	72	Unknown,	1 50	4 50	Lentz.
	18	Washington,	.33		P. R. R.,	1 50		Lubold.
	19	Rush,	450	900	Previous fire,			Carl.
	24	Williams,	50	18	Unknown,	5 55		Knorr.
	25	U. Paxton,	1.5	5	P. R. R. (?),	3 90		Feldt.
	25	Washington,	8	40	Unknown,	2 50		Lentz.

	28	U. Paxton,	66	152	P. R. R. (?),	13 45	13 00	Feldt.
	25	M. Paxton,	2		Unknown,	90		Shaffer.
	28	M. Paxton,	.5		P. R. R.,	68	25	Shaffer.
	30	Wiconisco,	45	45	Unknown,	9 70		Knorr.
May	1	Washington,	4	20	Unknown,	5 06		Lentz.
	3	U. Paxton,	2.5	5	Unknown,	2 80		Feldt.
	10	U. Paxton,	10	30	P. R. R. (?),	10 35		Feldt.
	11	Washington,	.5	8	Incendiary,	2 40		Lubold.
	12	Washington,	1.5	20	Incendiary,	7 50		Lubold.
	13	Washington,	1.5	20	Incendiary,	14 25		Lubold.
	15	E. Hanover,	250	530	Unknown,	30 80		Hampton.
	15-17	Jackson-Jefferson,	500	300	P. & R. R.,		211 00	Carl.
	15-18	Jefferson,	2,800	3,000	Incendiary,	35 00		Rutter.
	15-22	Wayne-Halifax-M. Paxton,	3,800	5,000	Log engine,	471 64	3 00	Romberger, Lebo & Matter.
	16	M. Paxton,	100	200	P. R. R. (?),	27 45		Lebo.
	16	U. Paxton,	11.5	100	P. R. R. (?),	5 75	1 50	Feldt.
	16	Washington,	2.5	75	Boy,	7 80		Lubold.
	16-17	Rush-Jackson,	300	350	Fishermen (?),	18 60		Knorr.
	16-19	Lykens,	400	600	Colliery dinkey,	49 22		Schmeltz.
	17	Washington,	?		Boy,	12 00		Lubold.
	18	U. Paxton,	2	4	P. R. R. (?),	2 33		Feldt.
	18-19	Rush,	350	700	Fishermen (?),	55 25		Carl.
	18-21	Lykens,	200	600	Unknown,	34 10		Ritzman.
	19-22	Jefferson,	5,000	5,000	Incendiary,	103 55		Rutter.
	20	M. Paxton,	20	5	Incendiary,	8 40		Rutter.
	20-22	Tower City borough,	900		Fishermen (?),		28 00	Carl.
	26	U. Paxton,	29	32	P. R. R. (?),	6 85		Feldt.
	27	U. Paxton,	1	3	P. R. R. (?),	2 38		Feldt.
June	18	Washington,	?	6	P. R. R.,	83		Lubold.
Nov.	8	Williams,	50	10	Unknown,	15 30		Knorr.
	8-9	Rush,	55	100	Hunters,	6 80		Carl.
	8-10	M. Paxton,	275	275	Unknown,	54 75		Lebo.
	11	M. Paxton,	6	50	Unknown,	2 25		Price.
			21,293.33	$25,473		$1,637 26	$476 75	
		DELAWARE COUNTY.						
Mar.	30	Radnor,	55					
		ELK COUNTY.						
Mar.	26	Benezette,	100	100	P. R. R.,		$10 00	Zerby.
	26	Benezette,	10	10	P. R. R.,	$3 72		Zerby.
	31	Benezette,	1	1	P. R. R.,	90	80	Zerby.
April	4	Benezette,	1	1	P. R. R.,			Zerby.
	10	Benezette,	1	2	P. R. R.,			Zerby.
	10-11	Horton,	20		P. S. & N.,	3 00	4 50	Nulf.
	11	Benezette,	1	1	P. R. R.,		80	Zerby.
	11	Jay,	1	2	P. R. R.,		75	Walker.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
11-12	Millstone,	8	35	Unkonwn,	90	2 25	Parrett.
12	Benezette,	25	25	P. R. R.,	2 66	4 00	Zerby.
16-17	Ridgway,	500	40	Unknown,	25 50		McClintock.
16-17	Spring Creek,	150	1,500	Unknown,	19 80		Jefferson.
16-17	Spring Creek,	20	180	Unknown,	7 75		Jefferson.
17	Ridgway,	100		Unknown,	16 50		McClintock.
17	Jay,	.25	1	P. R. R.,			Zerby.
17	Benezette,	2	10	P. R. R.,		1 60	Zerby.
17	Benezette,	350	350	P. R. R.,	14 40	10 00	Zerby.
17	Benezette,	2	3	P. R. R.,	90		Zerby.
17-18	Jay,	12.25	65	P. R. R.,	48	1 50	Zerby.
17-18	Benezette,	50		P. R. R.,	1 50	5 00	Nyce.
17-19	Benezette,	900	2,250	P. R. R.,	6 02	23 00	Zerby.
17-19	Benezette,	250	500	P. R. R.,	16 25	11 00	Zerby.
18	Millstone,	8	25	Unknown,	5 25		Parrett.
18	Ridgway,	200	100	Fishermen (?),	22 05		McClintock.
19	Benezette,	1	2	P. R. R.,	60		Zerby.
22-23	Jay,	500	50	Unknown,	4 80	5 25	Walker.
22-25	Highland,	10		B. & O. R. R.,	39 60		Blaisdell.
24	Benezette,	.25	1	P. R. R.,		50	Zerby.
25	Jay,	100	25	Unknown,		2 00	Kirk.
25	Benezette,	20	100	P. R. R.,		5 00	Zerby.
25-26	Ridgway,	60	40	Unknown,	35 10		McClintock.
28	Benezette,	300	450	P. R. R.,	4 79	11 00	Zerby.
28	Horton,	10		P. S. & N.,	1 80		Nulf.
28-29	Ridgway,	500		Boys fishing,		35 50	McChesney.
30	Snyder,	7		Clearing land,		3 00	McChesney.
May 3	Highland,	2		B. & O. R. R.,	6 75		Blaisdell.
13	Benezette,	1.5	3	P. R. R.,	1 20	50	Hartman.
14-17	Ridgway,	200	515	Unknown,	26 40		McClintock.
15-17	Spring Creek-Horton,	3,000		P. R. R.,	106 20		McChesney.
15-16	Fox,	50	20	P., S. & N. R. R.,	17 65	9 00	Smithbower.
15	Benezette,	10	10	P. R. R.,	5 40		Hartman.
15-17	Ridgway,	300	500	P. R. R.,	18 75	34 00	McClintock.
15-17	Benezette,	1,350	2,700	Unknown,	64 30	15 00	Johnson.
15-17	Highland,	50		B. & O. R. R.,	61 65		Blaisdell.
15-18	Bendzette,	1,000	3,000	Incendiary,	69 23		Patterson.
15-18	Jones,	300	225	P., S. & N. R. R.,	31 70	6 40	Evans.

	15-16	Bear Run-Benzinger,	450		P., S. & N. R. R.,	27 16		Samick.
	15-19	Spring Creek,	2,000	550	Unknown,	56 97		Shanley.
	16-17	Benzinger,	850		P. R. R.,	14 00		Samick.
	16-18	Jones,	100	125	P. R. R.,	10 25	18 00	McClintock.
	16-18	Horton-Ridgway,	5,000	1,000	Unknown,	118 65		Nulf.
	17	Benezette,	.1	1	P. R. R.,		75	Hartman.
	17	Benezette,	10		P. R. R.,			Nyce.
Nov.	10-11	Jay,	500	200	Unknown,	26 40	9 60	Zerby.
			18,889 35	$14,745		$801 92	$230 70	
		FAYETTE COUNTY.						
Feb.	11	Dunbar,	7		Smoker,		$4 28	Beatty.
Mar.	11	Bullskin,	25	$50	Burning brush,		4 00	Myers.
	26	N. Union,	4	15	Boy,	$ 92		Beatty.
	26	Springfield,	2		I. C. V. R. R.,			Barnes.
	31	Springfield,	5	50	I. C. V. R. R.,			Barnes.
	31	Wharton,	20		Burning brush,	1 58	75	Addis.
	31	Wharton,	10		Unknown,	3 30		Holland.
	31-4/1	N. Union,	650	1,950	Burning house,	98 52		Beatty.
	31-4/1	Connellsville,	55		Unknown,	10 95		Collins.
	31-4/2	Wharton,	400	205	Carelessness,	31 97		Addis.
April	1	Georges,	7	18	Unknown,	2 05		Beatty.
	1	N. Union,	5		Children,	5 55		Beatty.
	4	Springfield,	11	50	I. C. V. R. R.,			Barnes.
	4	Dunbar,	10		W. M. R. R.,	5 70		Collins.
	4	Dunbar,	20	20	Unknown,	75		Beatty.
	4-5	Wharton,	1,500	8,005	Burning brush (?),	56 20		Holland.
	16	Georges,	5		Unknown,	90		Tate.
	16	Georges,	9	101	B. & O. R. R.,	5 92	1 50	Beatty.
	16	Georges,	.25		Brick company,			Beatty.
	17	Springfield,	.5		I. C. V. R. R.,		1 80	Miller.
	17	Wharton,	20	5	Unknown,	10 20		Holland.
	18	Georges,	2	5	Brick company,	1 90	75	Beatty.
	23	Georges,	22	20	Unknown,	3 15	1 50	Tate.
May	3	Connellsville,	30		Unknown,	3 75	15 00	Collins.
	14	Dunbar,	11	25	P. R. R.,	75		Beatty.
	15	Bullskin,	150	200	Unknown,	10 05	50	Burket.
	15	Springfield,	85	27	Burning brush,		5 55	Shroyer.
	15	N. Union,	45	150	Unknown,	3 46		Beatty.
	17	Georges,	2		Brick company,		1 00	Beatty.
	18	Bullskin,	200	1,000	Unknown,	9 15	60	Schultz.
	18	Stewart,	200	1,285	Unknown,	22 35		Roebuck.
	18-19	Springfield,	300	305	Burning brush,		27 70	Shroyer.
	19	Henry Clay,	3	150	Boys (?),	7 20	1 50	Glisan.
	19	Henry Clay,	1		Unknown,	90		Glisan.
	19-20	Dunbar,	300		W. M. R. R.,	12 75		Roebuck.
	19-20	Dunbar,	65	750	Boys (?),	8 00	1 50	Beatty.
	19-20	Wharton,	150	100	Unknown,	19 95	1 65	West.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
	19-20	Saltlick,	60		Unknown,	11 50		White.
	19-20	Connellsville,	30		Unknown,	64 81	10 50	Collins.
	19-20	Bullskin,	200	1,230	Unknown,	56 75	8 75	Burket.
	19-21	Henry Clay,	150		Sawmill,	33 95	2 75	Gilsan.
	19-22	Springfield,	500	1,525	Unknown,	77 40		Miller.
	20	Wharton,	421	441	Unknown,	61 86	8 70	Holland.
	23	Georges,	10	50	Unknown,		3 00	Beatty.
Oct.	6	N. Union,	1		Burning rubbish,		25	Beatty.
Nov.	8-9	Georges,	100	200	Unknown,	6 60	1 20	Tate.
	11-12	Wharton,	275	100	Unknown,	26 35		Addis.
			6,057.75	$13,027		$677 09	$263 73	
		FOREST COUNTY.						
April	6	Tionesta,	50	$150	P. R. R.,	$4 35	$2 25	Monday.
	6	Tionesta,	.5		P. R. R.,	60		Thomson.
	14	Tionesta,	1		P. R. R.,	90		Thomson.
	16	Tionesta,	.5		P. R. R.,	30		Thomson.
	17	Tionesta,	1		P. R. R.,	60		Thomson.
	24	Kingsley,	75	200	Unknown,	6 00	1 50	Conger.
May	5	Harmony,	20	100	P. R. R.,	9 45		Linder.
	11	Harmony,	50	100	P. R. R. (?),	3 50	4 50	Anderson.
	14	Jenks,	50		B. & O. R. R.,	2 70		Eldridge.
	15	Jenks,	10	50	B. & O. R. R.,	3 60		Eldridge.
	17	Tionesta,	?	100	P. R. R.,	2 25		Monday.
	17	Jenks,	1,000		B. & O. R. R.,	2 25		Eldridge.
Nov.	14	Harmony,	9	100	Unknown,	8 10		Linder.
			1,267	$800		$44 60	$8 25	
		FRANKLIN COUNTY.						
Feb.	9	Washington,	3	$3	Clearing land,		$2 40	Staley.
Mar.	30-31	Quincy,	4	5	Unknown,		10 95	Staley.
	31	Quincy,	8	12	Unknown,	$3 18	14 69	Staley.
	31	Quincy,	1	2	Burning brush,		15	Staley.

April	1	Greene,	1.5	----	Carelessness,	65	4 33	Stull.
	2	Quincy,	.25	1	Unknown,	15	----	Staley.
	10	Peters,	2	4	Sawmill,	2 10	3 75	Rupp.
	11	Quincy,	1.5	3	Unknown,	2 28	60	Staley.
	11	Guilford,	.12	----	C. V. R. R.,	15	----	Staley.
	11	Greene,	75	75	Children (?),	10 48	16 35	Conklin.
	11	Peters,	1.5	3	Burning brush,	1 95	----	Rupp.
	12	Guilford,	.5	1	Incendiary,	83	4 80	Staley.
	13	Guilford,	4	8	Incendiary,	3 77	16 55	Staley.
	14	Quincy,	5	10	Incendiary,	7 60	4 45	Staley.
	14	Quincy,	1.5	1	Incendiary,	4 75	4 75	Staley.
	14	Quincy,	.5	1	Incendiary,	2 00	2 90	Staley.
	15	Quincy,	.5	1	Incendiary,	1 13	5 42	Staley.
	15	Guilford,	1.5	[illegible]	Incendiary,	1 65	----	Staley.
	15	Greene,	100	150	Carelessness,	30 25	17 44	Conklin.
	15	Warren,	50	100	Unknown,	44 29	----	Rupp.
	16	Greene,	5	10	Unknown,	10 25	13 50	Conklin.
	17	Peters,	?	----	C. V. R. R.,	----	30	Rupp.
	18	Peters,	1.5	3	C. V. R. R.,	90	3 80	Rupp.
	19	Peters,	.25	----	C. V. R. R.,	60	1 00	Rupp.
	23	Guilford,	2	4	Incendiary,	6 20	6 33	Staley.
	23	Quincy,	2	4	Incendiary,	99	72	Staley.
	23	Quincy,	.5	1	Incendiary,	----	----	Staley.
	23	Quincy,	.12	----	Incendiary,	15	1 17	Staley.
	23	Metal,	7	14	C. V. R. R.,	----	5 10	Rupp.
	25	Guilford,	25	96	Incendiary,	12 10	5 51	Staley.
	25	Peters,	.25	----	C. V. R. R.,	80	----	Rupp.
	29	Guilford,	?	----	Incendiary,	----	64	Staley.
	29	Guilford,	?	----	Incendiary,	----	72	Staley.
	29	Guilford,	5	2	Incendiary,	2 50	3 75	Staley.
May	2	Quincy,	2	6	Incendiary,	8 23	5 82	Staley.
	2	Guilford,	50	100	Incendiary,	6 10	8 10	Staley.
	2	Greene,	60	125	Incendiary,	34 79	29 90	Conklin.
	3	Washington,	4	10	Unknown,	1 20	15	Staley.
	5	Metal,	[illegible]	3	C. V. R. R.,	3 94	2 00	Rupp.
	9	Quincy,	[illegible]	2	Incendiary,	2 50	2 75	Staley.
	11	Quincy,	210	420	Incendiary,	15 98	11 57	Staley.
	12	Quincy,	1.5	8	Incendiary,	4 45	81	Staley.
	12	Quincy,	2.5	8	Incendiary,	5 70	----	Staley.
	12	Guilford,	100	300	Incendiary,	29 40	9 00	Staley.
	13	Peters,	1	28	Incendiary,	4 05	2 00	Rupp.
	14	Quincy,	30	120	Incendiary,	18 45	6 00	Staley.
	14	Quincy,	10	40	Incendiary,	4 50	----	Staley.
	14-15	Quincy,	7.5	23	Incendiary,	1 20	36	Staley.
	14-17	Quincy,	2,025	2,025	Incendiary,	181 35	210 25	Staley.
	15	Greene,	3	3	Unknown,	1 52	1 47	Conklin.
	15	Warren,	9	18	Sawmill,	16 09	8 55	Rupp.
	15-16	Letterkenny,	1	----	Sawdust pile,	11 03	1 80	Rupp.
	15-16	Quincy,	1.0	30	Incendiary,	2 66	1 00	Staley.
	16	Letterkenny,	1.5	2	Unknown,	27 30	4 00	Rupp.
	16-19	Quincy,	225	225	Incendiary,	22 08	60 50	Staley.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	17	Montgomery,	50	50	Unknown,	8 48		Rupp.
	18	Quincy,	1	3	Incendiary,	1 00	3 25	Staley.
	18	Quincy,	.5	1	Incendiary,	2 00	6 30	Staley.
	18	Guilford,	1	2	Incendiary,	3 00	4 75	Staley.
	19	Quincy,			False alarm,	1 32		Staley.
	19	Guilford,	.25	1	Incendiary,	2 80		Staley.
	20	Guilford,	1.5	6	Incendiary,	1 80		Staley.
May	21	Greene,	2	1	Unknown,		5 53	Conklin.
	21-22	Fannett,	400	100	Unknown,	136 90	11 36	Hart.
	24	Quincy,	50	100	Incendiary,	3 00	15 45	Staley.
	24	Guilford,	1	4	Incendiary,		1 20	Staley.
	25	Guilford,	.12	1	Incendiary,	1 29	1 76	Staley.
July	21	Letterkenny,	.5		Unknown,	70		Rupp.
Nov.	8	Lurgan,	100	50	Hunters,	48 58		Rupp.
	8-9	Montgomery,	300	400	Unknown,	19 14	1 08	Rupp.
	9	Metal,	7	7	Hunters,	8 16	5 25	Rupp.
	10	Peters,	8	20	Unknown,	20 11	1 00	Rupp.
	13	Montgomery,	10	10	Unknown,	5 76		Rupp.
	13	St. Thomas,	18	15	Unknown,	15 06		Rupp.
	13-14	Letterkenny-Metal,	150	150	Hunters,	37 84		Rupp.
	14	Fannett,	2	8	Hunters,	5 40		Wise.
	14	Quincy,	.5	5	Children,		1 05	Staley.
	15	Peters,	?		Hunters,			Rupp.
	16	Quincy,	8	9	Incendiary,		7 04	Staley.
	16	Quincy,	4	12	Incendiary,	1 20	12 14	Staley.
	16-18	Lurgan,	800	800	Incendiary,	159 63		Rupp.
	16-18	Lurgan, (a)	500	1,000	Incendiary,	38 70		Rupp.
	17	Guilford,	.25	1	Unknown,	60		Staley.
	17	Guilford,	1	5	Hunters,	1 50	10 40	Staley.
	17	Guilford,	6	12	Incendiary,	3 30	5 66	Staley.
	17	Quincy,	40	60	Incendiary,	3 80	20 80	Staley.
	17-18	Fannett,	500	30	Unknown,	47 90		Bryner.
	18	Quincy,	30	90	Incendiary,	10 70	34 40	Staley.
	18-19	Southampton,	83	83	Unknown,	36 10	31 50	Conklin.
	18-19	Fannett,	600	200	Unknown,	73 25		Lytle.
			6,783.11	$7,244		$1,253 10	$608 02	

FULTON COUNTY.

Feb.	23	Union,	20		Unknown,	$2 40		Rupp.
April	10	Licking Creek,	10	$49	Camp fire,		$3 75	Rupp.
	11	Licking Creek,	15	60	Traction engine,		8 60	Rupp.
May	17-21	Brush Creek,	260	235	Fisherman (?),	148 28		Rupp.
	19-20	Wells,	175	350	Incendiary,	93 45		Rupp.
June	3	Todd,	2	5	Clearing land,	1 50	2 94	Rupp.
Aug.	9	Dublin,			Lightning,		3 60	Rupp.
Oct.	20	Dublin,			Hunters,	75		Rupp.
Nov.	4	Union,	10		Smokers (?),	3 06		Rupp.
	6	Brush Creek,	18		Hunters,	7 02	1 08	Rupp.
	10-11	Wells, (b)	300	300	Unknown,	43 27		Rupp.
	11	Wells, (b)	40	40	Unknown,	14 40		Rupp.
	12	Wells,	160	90	Unknown,	8 30	50	Rupp.
	15-16	Bethel,	7	14	Hunters,	14 71	54	Rupp.
	16-17	Brush Creek,	250	250	Incendiary (?),	38 00		Rupp.
	16-17	Wells,	150	150	Unknown,	32 05		Rupp.
	26	Wells,	10	5	Unknown,	2 82		Rupp.
	27	Wells,	6		Unknown,	3 84		Rupp.
			1,433	$1,538		$413 80	$21 01	

HUNTINGDON COUNTY.

Mar.	19	Porter,	.12		Unknown,			Sharp.
	25	Penn,	2		H. & B. T. R. R.,	$1 20		Collins.
	26	Warriors Mark,	650	$2,900	Burning weeds,	14 75	$22 05	Geist.
	31	Hopewell,	3		H. & B. T. R. R. (?),	1 20		Treece.
April	1	Carbon, (b)	900	900	H. & B. T. R. R.,	2 70		Lytle.
	4	Hopewell,	2	10	H. & B. T. R. R.,	5 15	2 70	Maloney.
	4	Clay-Todd,	50	250	Unknown,	8 86		Rupert.
	4	Porter,	.06		Unknown,			Green.
	11	Warriors Mark-Franklin,	1,400	145	Unknown,	22 67	31 50	Geist.
	11	Union,	5	100	P. R. R.,	10 27	1 35	Rohrer.
	11	Morris,	10	5	Brick company,		2 50	Morton.
	15	Todd,	.5	1	Unknown,			Perry.
	16	Lincoln,	5	25	H. & B. T. R. R.,	7 53	60	Maloney.
	16	Brady,	4	8	Unknown,		2 25	Green.
	17	Todd,	25	50	Unknown,	2 20	10 50	Rupert.
	17-18	Oneida,	800	205	Unknown,	12 46		Morton.
	17-18	Walker,	6		H. & B. T. R. R.,	7 05		Moyer.
	17-18	Todd,	55	22	Burning brush,	17 65		Criswell.
	17-19	Carbon, (b)	32		Incendiary (?),	2 40	36	Lytle.
	20	Wood,	80	10	Unknown,	3 75		Black.
	21	Clay,	.5		Unknown,			Rupert.
	23	Porter,	4	4	P. R. R.,	3 00	2 10	Sharp.
	23	Porter,	1		Unknown,	1 05	60	Green.
	27	Todd,	.3	1	J. & S. R. R. Co. (?),		80	Perry.
	28	Spruce Creek,	40	40	P. R. R.,	9 30	76 00	Morton.

(a) See Cumberland county.
(b) See Bedford county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	28	Carbon,	.03		Burning brush,			Lytle.
	28	Morris,	15	8	Incendiary,	7 65	1 00	Johnson.
	30	Carbon,	5		Smoker,		9 00	Lytle.
May	2	Cass,	200	25	Unknown,	22 08	10 00	Saylor.
	3	Lincoln,	2	1	H. & B. T. R. R.,	3 45	1 20	Maloney.
	3	Lincoln,	10	4	H. & B. T. R. R.,	3 15	15 00	Criswell.
	4	Wood,	500	250	Unknown,	23 68		Stevens.
	12	Clay,	45	200	Burning rubbish,	14 33		Heeter.
	12	Hopewell,	5	18	H. & B. T. R. R.,	1 95	1 00	Treece.
	14	Warriors Mark,	30	8	P. R. R.,	1 50	4 95	Geist.
	14	Lincoln,	3		Burning brush,			Perry.
	15	Shirley,	30	150	Unknown,	27 45		Diven.
	15-16	Barree,	100	50	Burning house,	38 75	2 25	McAlevy.
	15-16	Walker,	14		H. & B. T. R. R.,	8 15	3 00	Moyer.
	16	Walker,	45		H. & B. T. R. R.,	4 80	4 00	Moyer.
	16	Clay,	20	30	Unknown,	5 95	8 90	Rupert.
	16	Warriors Mark,	10		Unknown,	3 60	1 20	Harpster.
	17	Warriors Mark,	35		P. R. R.,	2 70	25 50	Harpster.
	17	Oneida,	40	80	Unknown,	4 35		Morton.
	17-18	Cass-Todd,	450	4,500	Unknown,	54 30		Saylor.
	17-19	Carbon,	900	3,325	Incendiary,	11 40	51 00	Lytle.
	17-21	Brady,	200	500	Unknown,	60 67	4 05	Metz & Green.
	18-19	Hopewell,	125	800	Sawmill,	90 41		Maloney.
	18-21	Brady,	6	20	Power wire,	15 64	6 00	Rohrer.
	19	Union,	4	25	Carelessness,	5 06	75	Rohrer.
	21	Porter,	.1		P. R. R. (?),			Shark.
Sept.	13	Lincoln,	4		Unknown,	1 95		Criswell.
Oct.	8	Juniata,	5	50	Unknown,	5 95		Bush.
	22	Jackson,			Hunters,		1 20	Benson.
Nov.	3	Carbon,			Children,			Lytle.
	6	Walker,	3	25	H. & B. T. M. R. R.,	3 00	1 68	Perry.
	7	Juniata,	1		Burning rubbish,	1 40	80	Yocum.
	10	Carbon,	5		H. & B. T. M. R. R.,		1 00	Lytle.
	10	Hopewell,			H. & B. T. M. R. R.,	2 20		Treece.
	10-14	Wood,	200	500	Unknown,	56 10		Black.
	15	Clay,	1.5	5	Hunters,	4 88		Rupp.
	16-18	Porter,	80	100	Hunters,	37 64		Green.

	17-18	Porter,	50	50	Hunters,	5 70		Green.
	17	Porter,	.5	5	Hunters,	46		Green.
	18	Porter,	150	200	Dinkey,	39 80	90 00	Morton.
	19-20	Carbon,	15	156	Unknown,	9 30	9 25	Perry.
	20	Shirley,	2	1	Unknown,	1 20	2 00	Bastian.
			7,382.11	$15,762		$709 64	$402 44	
		INDIANA COUNTY.						
Mar.	26	White,	30	$30	Unknown,	$24 50		Nealer.
	26	Grant-East Mahoning,	30		Savan Coal Co.,	2 70		Jeffries.
	26-27	Washington,	125	400	Smoker,		$10 85	Walker.
April	1	Brush Valley,	50	315	Boys,	9 75		Grow.
	11	Burrell-W. Wheatfield,	558	558	Unknown,	14 10		Gamble.
	16	Banks,	5	15	Unknown,	1 20	1 20	Barkey.
	16-17	Cherry Hill,	250		Unknown,	10 50		Simpson.
	17	Grant,	200	320	Savan Coal Co.,	9 75	3 15	Jeffries.
	22	Canoe,	2		Unknown,	4 15		Lowmaster.
	22-23	E. Wheatfield, (a)	8		P. R. R.,	21 50		Troska.
	25	E. Wheatfield,	5		Camp fire,	7 80	1 05	Troska.
	29	White,	40	430	B. R. & P. R. R.,	13 00		Nealer.
May	3	E. Wheatfield,	.5		P. R. R.,	90	90	Weller.
	18	W. Wheatfield,	21		Sawmill,	3 45	3 60	Gamble.
	18	Buffington,	10	25	Unknown,	3 60		Grow.
	18	Pine,	40	8	Burning brush,	6 38	90	Dearmy.
	19	Buffington,	25	100	Burning rubbish,		11 95	Dearmy.
Nov.	14	W. Wheatfield,	25	100	Unknown,	11 00		Clark.
			1,424.5	$2,301		$144 28	$33 60	
		JEFFERSON COUNTY.						
April	15-20	Winslow,	100	$300	P. R. R.,	$26 25		Cox.
	16-17	Winslow,	40	100	Unknown,	14 55		Cox.
	17-18	Winslow,	150	850	Unknown,	20 10		Cox.
	20-21	Winslow,	10	50	Unknown,	12 00		Cox.
	25	Bell,	20	328	Steam shovel,	6 10		Lowmaster.
May	3	Warsaw,	1.75	1	P. & S. R R.,	2 10		Barrett.
	12	Eldred,	17	40	Burning brush,		$2 80	Park.
	14	Warsaw,	?		P. & S. R. R.,	60		Barrett.
	15-16	Winslow,	200	1,000	Unknown,	27 90		Cox.
			538.75	$2,664		$109 60	$2 80	
		JUNIATA COUNTY.						
Mar.	24	Milford,	7	$14	Log engine (?),	$0 90		McCahan.
	24-27	Tuscarora,	7	2	T. V. R. R.,		$0 60	Smith.
	26	Milford,	800	1,600	Log engine (?),	6 75		McCahan.

(a) See Cambria county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
26	Tuscarora,	1	1	T. V. R. R.,			Smith.
31	Tusacrora,	3	1	T. V. R. R.,		10	Smith.
31	Tuscarora,	1	1	T. V. R. R.,		10	Smith.
31	Tuscarora,	4	1	T. V. R. R.,	1 20	80	Smith.
31-4/1	Milford.	500	1,000	Log engine (?),	14 10	6 75	McCahan.
April 3	Lack,	4	1	T. V. R. R.,		75	Smith.
4-5	Fayette,	400	220	Unknown,	20 60		Lauver.
9-10	Milford,	600	1,200	Unknown,	7 65	2 25	McCahan.
12	Walker,	8	5	Burning brush,	6 30	30	Kauffman.
13	Tuscarora,	3	3	T. V. R. R.,		75	Middagh.
May 2-4	Fermanagh,	?	818	Sawmill,	13 20		Shellenberger.
10	Milford,	3	15	Log engine (?),	4 80	60	McCahan.
14	Milford,	250	150	Log engine (?),	6 90	2 10	McCahan.
16-17	Milford,	400	1,200	Unknown,	15 00	4 20	McCahan.
16-18	Fayette.	6,200	62,570	Unknown,	334 09		Lauver.
16-21	Beale.	350	350	Incendiary,	158 70		Titzell.
17	Tuscarora,	47	212	T. V. R. R.,	2 55	2 50	Smith.
17-18	Fermanagh,	80	248	Incendiary,	54 20	8 75	Shellenberger.
17-18	Fayette,	2,440		Unknown,	103 13		Marks.
18	Walker,	3	2	Burning brush,		4 50	Walker.
19-20	Milford,	700	2,100	Unknown,	28 80		McCahan.
25	Lack,	2		Unknown,	4 95	1 20	Lauthers.
Nov. 9	Tuscarora,	8		Hunters,	14 40	90	McMeen.
10-11	Milford,	2		Unknown,	4 42	7 40	Bastian.
15-16	Delaware.	15	42	Unknown,	6 60		Allen.
16	Milford.	3	50	Hunters,	11 35		McCahan.
16-17	Milford.	300	100	Hunters,	15 30		McCahan.
19	Milford.	.5		Hunters,	1 35		McCahan.
		13,136.5	$71,902		$837 24	$39 55	
	LACKAWANNA COUNTY.						
Mar. 4	Dunmore borough,	6		Erie or D., L. & W. (?),	$2 25		Earley.
22	Throop,	18.5		D., L. & W. R. R.,	4 95		Earley.
22-23	Throop,	7.5		Unknown,	3 60	$2 70	Earley.
April 9	Dunmore borough,	6		Unknown,	2 40		Earley.
11	Ransom,	5	$5	Smokers (?),	1 80	2 10	Frost.

	1	Covington,	150		Unknown,	10 80		Larnerd.
	14-15	Clifton,	50	150	W. B. & E. R. R., (?),	11 55	3 60	Smith.
	14-15	W. Scranton,	15		D., L. & W. R. R. (?),	7 20	3 15	Earley.
	15-16	Spring Brook,	300	500	Unknown,	19 95		Haines.
	16	W. Scranton,	15		Unknown,	1 65		Earley.
	18	Spring Brook,	250	200	W. B. & E. R. R.,	31 65		Larnerd.
	18-19	Spring Brook,	75	150	W. V. & E. R. R.,	19 80		Haines.
	19-20	Clifton,	150	300	W. B. & E. R. R. (?),	17 10	4 05	Smith.
	22	Jefferson,	30	175	Unknown,	10 20		Moore.
	22	Dunmore borough,	12		E. R. R.,	5 40		Earley.
	23	Spring Brook,	50	100	W. B. & E. R. R.,	6 30		Haines.
	24-26	Benton,	60	300	Unknown,	28 20		Stanton.
	24-26	Olyphant borough,	600		Unknown,	28 20		Earley.
	25	Spring Brook,	75	250	W. B. & E. R. R.,	9 00		Haines.
May	13-14	Throop-Jefferson,	200	100	Unknown,	6 00		Earley.
	14-15	Clifton,	25	50	Unknown,	7 98		Courtney.
	15-16	Elmhurst,	100	50	D., L. & W. R. R. (?),	4 50	3 00	Earley.
	15-16	Clifton,	250	200	W. B. & E. R. R.,	24 75		Smith.
	15-17	Spring Brook-Lehigh,	500	250	Unknown,	43 95	10 00	Kauffman.
	20-21	Clifton,	100	125	W. B. & E. R. R. (?),	14 25		Smith.
	26-27	Lehigh,	232	116	Unknown,	37 63	9 20	Kauffman.
Nov.	1	Ransom,	50	50	Unknown,	2 10		Frost.
	7	Clifton,	15	50	Unknown,	6 00		Smith.
	12	Clifton,	75	150	Unknown,	10 70		Smith.
			3,417	$3,271		$379 86	$37 80	
		LANCASTER COUNTY.						
April	4	Salisbury,	8	$50	Burning grass,	$8 45	$0 75	Bair.
	16	E. Earl—Caernarvon,	200	2,000	P. R. R.,	48 75		Geist.
	19	E. Earl,	150	1,600	P. R. R.,	26 20		Geist.
	25 26	Salisbury,	40	200	Unknown.	4 70		Bair.
May	15-17	E. Earl-Salisbury-Caernarvon,	100	5,100	P. R. R.,	31 00		Geist.
	19-20	Caernarvon,	100	1,020	P. R. R.,	16 55		Geist.
Nov.	16	E. Earl,	3	50	P. R. R.,	5 00		Geist.
	15	Salisbury,	3	50	Hunters.			Keene.
			1,604	$10,070		$140 65	$0 75	
		LEBANON COUNTY.						
Mar.	31	Annville-Londonderry,	150	$2,500	Unknown,	$9 00		Ibach.
April	17	Swatara,	12		Unknown,	6 67		Phillips.
	19	Mill Creek,	200	500	Burning brush,	21 15		Ibach.
	25	Cold Spring,	.25		P. & R. R. R.,	30		Foster.
May	11-12	Cold Spring,	300	100	P. & R. R. R.,	22 71		Felty.
	15-16	Cold Spring,	10		P. & R. R. R.,	3 30		Foster.
	17	Union,	50	100	Unknown,	21 25		Felty.
	19-22	Cold Spring,	1,500		P. & R. R. R.,	3 00	$25 50	Foster.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
Nov.	15-16	E. Hanover,	100	125	Hunters,	11 60		Hampton.
	15-16	E. Hanover,	70		Hunters (?),	13 45		Rank.
	16	S. Lebanon,	200		Mine engine,	3 80	2 25	Nelson.
			2,592.25	$3,825		$116 23	$27 75	
		LEHIGH COUNTY.						
Mar.	30	Washington,	4		Unknown,	$0 90		Dorward.
April	4	Washington,	180	$210	Unknown,	16 35	$ 90	Dorward.
	11-12	Heidelberg (a),	150	300	Brush burning,	24 85		Heffintrayer.
	16	Lynn,	8	75	Incendiary,	4 51	45	Donat.
May	14	U. Saucon,	4	30	Unknown,	3 70		Mory.
	14-18	Heidelberg (a),	2,000	10,000	Lehigh R. R.,	206 53		Heffintrayer.
	17-20	Lynn (b),	626	250	Unknown,	48 60		Donat.
	20-21	Salisbury,	20	350	Unknown,	10 35		Miller.
Nov.	6-7	Heidelberg-Lynn,	500	500	Hunters,	59 00		Heffintrayer.
	10	Salisbury,	40		Hunters,	12 30		Ludwig.
			3,532	$11,715		$387 09	$1 35	
		LUZERNE COUNTY.						
April	1	Union,	20	$50	Unknown,	$6 15		Dorber.
	1	Duryea borough,	80	80	Unknown,	4 80		Frost.
	1	Dennison,	2		Unknown,	3 30		Amend.
	1	Dennison,	30	75	C. R. of N. J.,	1 20		Amend.
	1	Dennison,	2.5		Unknown,	1 96		Amend.
	1-2	Plymouth,	100	80	Unknown,	22 80		Warman.
	1-2	Salem,	2		Smoker,	6 90	$ 45	Robbins.
	3	Bear Creek,	3.5		L. V. R. R.,	3 00		Bond.
	4	Hazle,	30		Unknown,	8 70		Fowler.
	4	Dennison,	1.5		Unknown,	1 50		Amend.
	4-5	Salem,	60	90	Unknown,	14 70	1 50	Robbins.
	10	Fairview,	200	200	Unknown,	27 75		Couety.

10-11	Hazle,	100	125	Unknown,	18 25		Wolfe.
11	Fairview,	100	100	Unknown,	18 75		Conety.
11	Dennison,	3		C. R. R. of N. J.,	1 50		Amend.
11	Dennison,	2		C. R. R. of N. J. (?),	1 50		Amend.
11	Dennison,	1.5		C. R. R. of N. J.,	1 20	75	Amend.
11	Dennison,	4	16	C. R. R. of N. J.,	1 20	30	Amend.
11	Dennison,	5	25	Unknown,	1 35		Amend.
11	Hazle,	50		L. V. R. R. (?),	3 60	3 00	Wiener.
11	Exeter,	50		Burning rubbish,			State Police.
12	Duryea borough,	40		Unknown,	5 25		Frost.
12-13	Dennison,	150		Unknown,	2 55		Barry.
13	Hazle,	150	200	Stripping loki (?),	14 85		Wiener.
14-16	Sugar Loaf,	300	500	P. R. R. (?),	23 30	9 00	Lucki.
16	Dorrance-Butler,	400		Unknown,	4 05		Eckrote.
16-17	Wright,	500	100	Unknown,	4 73		Storm.
17	Jackson,	120	100	Boys,	9 00		Ehret.
17	Hazle,	100	100	Unknown,	2 79		Wiener.
17-18	Franklin,	58		Unknown,		1 80	Boettner.
18	Dennison,	.5		L. V. R. R.,			Amend.
18	Dennison,	3	3	L. V. R. R. (?),	2 40	30	Amend.
18	Bear Creek,	80	50	L. V. R. R.,	24 60		Bond.
19	Laurel Run,	8	20	Unknown,	5 25		Bower.
19	Bear Creek,	800	500	L. V. R. R. (?),	24 30		Bond.
19	Bear Creek,	50		Fishermen (?),	13 85		Amend.
20	Fairmount,	5	25	Unknown,	4 35		Blaine.
22	Jackson,	10	50	Unknown,	8 55	60	Ehret.
22	Plymouth,	200	150	Unknown,	10 80		Warman.
22	Laurel Run,	10	25	Unknown,	5 40		Bower.
22	Dorrance,	50		Unkonwn,	13 35	1 80	Stein.
22	Laurel Run,	6	15	Unknown,	3 60		Bower.
22	Duryea borough,	15	15	Unknown,	1 80		Frost.
22-23	Plymouth,	500	800	Unknown,	30 15		Bonning.
22-23	Union,	280	250	Unknown,	31 90		Robbins.
22-23	Hazle,	75	300	Stripping loki (?),	14 25	2 40	Wiener.
23	Union,	300	500	Unknown,	41 08		Sorber.
23	Plymouth,	180	100	Unknown,	8 10		Warman.
23	Exeter,	2		Unknown,		60	State Police.
25	Hazle,	10	50	L. V. R. R.,	60		Airey.
25	Dorrance-Butler,	300		Unknown,	14 25		Eckrote.
25	Hazle,	125	375	Unknown,	12 60		Wiener.
25	Ross,	20	50	Burning brush,	10 65	2 25	Blaine.
25	Kingston,	10		Burning brush,			State Police.
25-26	Bear Creek,	300	500	L. V. R. R.,	55 35		Bond.
27	Hazle,	2		L. V. R. R.,	45		Airey.
28	Bear Creek,	2		L. V. R. R.,			Bond.
28	Duryea borough,	35	25	Unknown,	3 00		Frost.
29	Duryea borough,	60	60	Unknown,	5 40		Frost.
29	Laurel Run,	15	40	Unknown,	10 80		Bower.
29	Wright,	400	505	Unknown,	23 40	7 20	Williams.

(a) See Carbon county.
(b) See Schuylkill county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
29	Union,	350	500	Unknown,	42 55		Sorber.
May 3	S. Hazleton,	?		Boy,	30		Airey.
8	Laurel Run,	10	35	Boys,	4 20		Bower.
13	Plymouth,	140	170	Unknown,	30 00		Warman.
14	Hazle,	5		L. V. R. R.,	30		Airey.
14-15	Dallas,	89	600	L. V. R. R.,	90		Keller.
14-15	Dallas,	48	504	Unknown,			Keller.
14-15	Bear Creek-Dennison,	600	600	Unknown,	12 60	16 00	Bond.
15	Buck,	80		Unknown,	45 80		Hurd.
15	Dorrance,	3		Burning brush,	2 80	3 60	Stein.
15-16	Bear Creek,	400	600	Unknown,	25 50		Hurd.
15-16	Laurel Run-Bear Creek,	3,000	1,000	Unknown,	115 05		Bowers & Bond.
16	Duryea borough,	50	50	Unknown,	4 50		Frost.
19	Dorrance,	150	150	Unknown,	6 85		Kanaske.
19	Hazle,	22		L. V. R. R.,	45		Airey.
19	Bear Creek,	25	25	Incendiary,	7 05		Bond.
19	Wright,	100	500	Unknown,	15 95	75	Williams.
19	Plymouth,	45	90	Unknown,	15 00		Warman.
19-20	Black Creek,	4,000	15,000	Unknown,	30 10		Crouse.
19-20	Wright,	400	600	Burning brush (?),	38 55		Williams.
19-20	Bear Creek,	200	150	L. V. R. R.,	35 25		Bond.
19-21	Plymouth,	200	200	Burning brush,		1 20	Bonning.
19-21	Black Creek,	350	1,000	Unknown,	30 65		Lucki.
20	Wright-Dorrance,	200		Unknown,	16 65		Eckrote.
20-21	Huntingdon,	75	500	Unknown,	28 45	4 50	Linskill.
21	Dorrance,	50		Unknown,	4 50		Stein.
21	Duryea,	35	75	Unknown,	3 30		Frost.
21	Dorrance,	2		Unknown,	3 00		Eckrote.
21-22	Butler-Sugar Loaf,	300	650	Unknown,	39 90		Lucki.
26	Lake,	50	200	Burning brush,	8 05	1 20	Keller.
27	Sugar Loaf,	175	500	Unknown,	10 50		Lucki.
Aug. 5	Salem,	5	20	Unknown,	5 89		Robbins.
Sept. 28	Duryea borough,	2.5	25	Mushroomers,	1 50		Frost.
Nov. 9	Kingston,	12	100	Unknown,	6 00		Patrick.
9	Kingston,	50	225	Unknown,		1 20	Linskill.
10	Union,	35	100	Unknown,	3 40		Linskill.
10-11	Butler,	150	100	Hunters,	13 90		Shelmer.
11	Union,	75	500	Hunters,	45 50		Dorber.

	11	Union,	2		D., L. & W. R. R.,	7 22		Robbins.
	12	Cunningham,	15	500	Unknown,	5 20		Readler.
	12	Kingston,	4	10	Hunters,	2 70		Patrick.
	13	Kingston,	2	5	Incendiary,	1 80		Patrick.
	14	Kingston,	20	150	Hunters,	50		Linskill.
	15	Fairview,	62	100	Unknown,	19 50		Conety.
	15-16	Kingston,	1	2	Unknown,	30		Linskill.
	15-16	Butler,	1,500	1,000	Unknown,	24 70	40	Eckrote-Shelhamer.
	16-17	Plymouth,	85	160	Unknown,	17 70		Warman.
	18	Butler,	100	500	Unknown,	7 40		Shelhamer.
	18	Dennison,	8		Unknown,	8 90		Amend.
	18-19	Butler,	300	125	Smokers,	7 50		Shelhamer.
	18-21	Sugar Loaf,	450	750	Unknown,	43 20		Lucki.
	19	Fairmount,	1		Unknown,	2 60	2 60	Linskill.
	19	Union,	50	150	Unknown,		60	Linskill.
	19	Dennison,	5		Unknown,	1 55		Amend.
	19	Newport,	200	300	Unknown,	9 85	1 00	Linskill.
	19-20	Ross-Lehman,	150	150	Unknown,	4 84	1 20	Linskill.
	19-21	Black Creek,	310	3,500	Hunters,	28 05		Lucki.
	20	Kingston,	10	20	Unknown,	2 40	3 60	Patrick.
Dec.	1	Union,	10	10	Unknown,	7 40		Sober.
	7	Jackson,	300	415	Unknown,	16 80		Redmond.
			21,537	$35,375		$1,461 86	$69 89	
		LYCOMING COUNTY.						
Mar.	20	Lewis,	1		Unknown,			Wells.
	20	Lewis,	.05		P. R. R. (?),			Newman.
April	4	Lewis,	.2	$1	P. R. R.,			Wells.
	4	Brown,	25	25	N. Y. C. (?),	$9 00	$19 40	Neefe.
	10	Fairfield,	80		Sawmill,	1 95		Persun.
	10	Pine,	2	5	Shingle mill,		3 60	Schneider.
	10-12	Watson,	233	1,265	Unknown,	51 40	78	Harer.
	11	Washington,	1	2	Burning brush,	90	1 71	Baer.
	11	Cogan House,	15	5	Burning rubbish,		6 10	Hopkins.
	11-12	Jackson,	50	20	Burning stumps,		20 25	Beck.
	11-12	Brown-McHenry,	100	600	N. Y. C. R. R.,	33 15	37 80	Neefe.
	11-13	Armstrong,	2,560	450	Burning brush,	180 37	37 08	Baer.
	18	Lewis,	1		P. R. R.,			Wells.
	16	Woodward,	40	20	Clearing land,	4 35	2 40	Hoffman.
	16	Lewis,	50		Camp fire,		18 53	Wels.
	17	Pine,	.5	10	Fishermen (?),	15 00	1 40	Neefe.
	17	Pine-Cogan House,	30	185	Smoker (?),	24 35	1 80	Hopkins.
	17-18	Pine,	1.5	5	Smoker (?),	15 73		Brown.
	17-18	Penn-Franklin,	25	150	Unknown,	27 60	2 70	Houseknecht.
	18	Pine,	5	25	Burning brush,	8 70		Schneider.
	18	Cogan House,	10		Burning brush,		19 90	Mecum.
	18	McNett,	15	56	Unknown,	9 75	90	Baxter.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
29	Union,	350	500	Unknown,	42 55		Sorber.
May 3	S. Hazleton,	?		Boy,	30		Airey.
8	Laurel Run,	10	35	Boys,	4 20		Bower.
13	Plymouth,	140	170	Unknown,	30 00		Warman.
14	Hazle,	5		L. V. R. R.,	30		Airey.
14-15	Dallas,	89	600	L. V. R. R.,	90		Keller.
14-15	Dallas,	48	504	Unknown,			Keller.
14-15	Bear Creek-Dennison,	600	600	Unknown,	12 60	16 00	Bond.
15	Buck,	80		Unknown,	45 80		Hurd.
15	Dorrance,	3		Burning brush,	2 80	3 60	Stein.
15-16	Bear Creek,	400	600	Unknown,	25 50		Hurd.
15-16	Laurel Run-Bear Creek,	3,000	1,000	Unknown,	115 05		Bowers & Bond.
16	Duryea borough,	50	50	Unknown,	4 50		Frost.
19	Dorrance,	150	150	Unknown,	6 85		Kanaske.
19	Hazle,	22		L. V. R. R.,	45		Airey.
19	Bear Creek,	25	25	Incendiary,	7 05		Bond.
19	Wright,	100	500	Unknown,	15 95	75	Williams.
19	Plymouth,	45	90	Unknown,	15 00		Warman.
19-20	Black Creek,	4,000	15,000	Unknown,	30 10		Crouse.
19-20	Wright,	400	600	Burning brush (?),	38 55		Williams.
19-20	Bear Creek,	200	150	L. V. R. R.,	35 25		Bond.
19-21	Plymouth,	200	200	Burning brush,		1 20	Bonning.
19-21	Black Creek,	350	1,000	Unknown,	30 65		Lucki.
20	Wright-Dorrance,	200		Unknown,	16 65		Eckrote.
20-21	Huntingdon,	75	500	Unknown,	28 45	4 50	Linskill.
21	Dorrance,	50		Unknown,	4 50		Stein.
21	Duryea,	35	75	Unknown,	3 30		Frost.
21	Dorrance,	2		Unknown,	3 00		Eckrote.
21-22	Butler-Sugar Loaf,	300	650	Unknown,	39 90		Lucki.
26	Lake,	50	200	Burning brush,	8 05	1 20	Keller.
27	Sugar Loaf,	175	500	Unknown,	10 50		Lucki.
Aug. 5	Salem,	5	20	Unknown,	5 89		Robbins.
Sept. 28	Duryea borough,	2.5	25	Mushroomers,	1 50		Frost.
Nov. 9	Kingston,	12	100	Unknown,	6 00		Patrick.
9	Kingston,	50	225	Unknown,		1 20	Linskill.
10	Union,	35	100	Unknown,	3 40		Linskill.
10-11	Butler,	150	100	Hunters,	13 90		Shelmer.
11	Union,	75	500	Hunters,	45 50		Dorber.

	11	Union,	2		D., L. & W. R. R.,	7 22		Robbins.
	12	Cunningham,	15	500	Unknown,	5 20		Readler.
	12	Kingston,	4	10	Hunters,	2 70		Patrick.
	13	Kingston,	2	5	Incendiary,	1 80		Patrick.
	14	Kingston,	20	150	Hunters,	50		Linskill.
	15	Fairview,	62	100	Unknown,	19 50		Conety.
	15-16	Kingston,	1	2	Unknown,	30		Linskill.
	15-16	Butler,	1,500	1,000	Unknown,	24 70	40	Eckrote-Shelhamer.
	16-17	Plymouth,	85	160	Unknown,	17 70		Warman.
	18	Butler,	100	500	Unknown,	7 40		Shelhamer.
	18	Dennison,	8		Unknown,	3 90		Amend.
	18-19	Butler,	300	125	Smokers,	7 50		Shelhamer.
	18-21	Sugar Loaf,	450	750	Unknown,	43 20		Lucki.
	19	Fairmount,	1		Unknown,	2 60	2 60	Linskill.
	19	Union,	50	150	Unknown,		60	Linskill.
	19	Dennison,	5		Unknown,	1 55		Amend.
	19	Newport,	200	300	Unknown,	9 85	1 00	Linskill.
	19-20	Ross-Lehman,	150	150	Unknown,	4 84	1 20	Linskill.
	19-21	Black Creek,	310	3,500	Hunters,	28 05		Lucki.
	20	Kingston,	10	20	Unknown,	2 40	3 60	Patrick.
Dec.	1	Union,	10	10	Unknown,	7 40		Sober.
	7	Jackson,	300	415	Unknown,	16 80		Redmond.
			21,537	$35,375		$1,461 86	$69 89	
		LYCOMING COUNTY.						
Mar.	20	Lewis,	1		Unknown,			Wells.
	20	Lewis,	.05		P. R. R. (?),			Newman.
April	4	Lewis,	.2	$1	P. R. R.,			Wells.
	4	Brown,	25	25	N. Y. C. (?),	$9 00	$19 40	Neefe.
	10	Fairfield,	80		Sawmill,	1 95		Persun.
	10	Pine,	2	5	Shingle mill,		3 60	Schneider.
	10-12	Watson,	233	1,265	Unknown,	51 40	78	Harer.
	11	Washington,	1	2	Burning brush,	90	1 71	Baer.
	11	Cogan House,	15	5	Burning rubbish,		6 10	Hopkins.
	11-12	Jackson,	50	20	Burning stumps,		20 25	Beck.
	11-12	Brown-McHenry,	100	600	N. Y. C. R. R.,	33 15	37 80	Neefe.
	11-13	Armstrong,	2,560	450	Burning brush,	180 37	37 08	Baer.
	13	Lewis,	1		P. R. R.,			Wells.
	16	Woodward,	40	20	Clearing land,	4 35	2 40	Hoffman.
	16	Lewis,	50		Camp fire,		18 53	Weis.
	17	Pine,	.5	10	Fishermen (?),	15 00	1 40	Neefe.
	17	Pine-Cogan House,	30	135	Smoker (?),	24 35	1 80	Hopkins.
	17-18	Pine,	1.5	5	Smoker (?),	15 73		Brown.
	17-18	Penn-Franklin,	25	150	Unknown,	27 60	2 70	Houseknecht.
	18	Pine,	5	25	Burning brush,	8 70		Schneider.
	18	Cogan House,	10		Burning brush,		19 90	Mecum.
	18	McNett,	15	56	Unknown,	9 75	90	Baxter.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
April	23-24	McIntyre,	300	$10	P. R. R.,	$9 10	$22 50	Reed.
	24	Lewis,	70	200	P. R. R.,	21 95	10 20	Weis.
	25	Lewis,	1		P. R. R.,			Wells.
	25	Lewis,	.5		P. R. R.,			Wells.
	28-29	Jackson,	10		Burning edgings,	8 70	7 05	Beck.
	28-29	Lewis,	5		P. R. R.,	13 85		Moyer.
May	2	Franklin,	?		Unknown,		90	Lunger.
	4	Nippenose,	150	3,000	P. R. R.,	10 35	12 50	Simpson.
	11	U. Fairfield,	2.5	150	Unknown,	9 90		Keyte.
	11-15	Susquehanna,	350	6,000	P. R. R.,	84 40	62 50	Simpson.
	14	Mifflin,	1	25	Burning brush,		6 00	Gohl.
	14-15	Armstrong,	800	500	Unknown,	44 35		Decker.
	14-17	Clinton-Armst.,	4,500	3,752	P. R. R.,	410 37	237 63	Baer.
	14-17	McIntyre,	200	500	Unknown,	21 50		Reed.
	14-18	Pine,	4,000	8,000	Incendiary (?),	176 23	9 20	Harbeson.
	15	Lewis,	63	200	P. R. R.,	23 70	8 40	Weis.
	15-16	Franklin-Pine,	40.25	500	Burning brush,		22 85	Lunger.
	15-16	Nippenose,	1,000	2,000	P. R. R. (?),	152 60	35 00	Metzger.
	15-16	Pine,	50	150	Unknown,	29 75		Heyler.
	15-18	McHenry,	2,500	25,000	Boys (?),	308 60	56 46	Neefe.
	16-19	Pine (a),	400	533	Incendiary,	39 70		Harbeson.
	17-21	Washington (b),	980	900	Unknown,	148 05	57 39	Baer.
	19	Bastress,	200	1,000	P. R. R.,	7 30	100 00	Simpson.
	20	Washington,	100	200	Unknown,	18 30	6 25	Metzger.
	21	Limestone-Wash.,	300	600	Unknown,	57 55	5 20	Metzger.
	21-22	Limestone-Wash.,	340	175	Unknown,	60 75	6 60	Baer.
	26	McHenry,	500	1,500	Unknown,	65 10	2 40	Neefe.
	28-29	Gamble,	?		Burning sawmill,	43 35	7 60	Bastian.
Nov.	9	McHenry,	40	100	Hunters,	22 40		Neefe.
	9-11	Lewis-Cascade,	400	650	Hunters,	55 80		Moyer.
	10	Lewis,	1		P. R. R.,	1 20		Weis.
	10-11	McIntyre,	300	300	Unknown,	22 00		Newman.
	15	Watson,	10		Erie R. R.,	16 65	4 40	Neefe.
	18-19	Armstrong,	500	200	Unknown,	31 90		Decker.
			21,359.5	$58,010		$2,297 65	$855 38	

		McKEAN COUNTY.						
April	11	Bradford,	2	$300	Erie R. R.,		$10 00	Bryner.
	11	Keating,	50		P. R. R.,	$ 90		Cummings.
	17	Hamlin,	1		P. S. & N. R. R.,	00	90	Swanson.
	17	Keating,	40		Kushequa R. R.,	11 70	10 50	Cummings.
	18-19	Liberty,	150	43	Burning grass,	7 95		Lewis.
	18-19	Keating,	25		Children (?),	5 70		Cummings.
	26-27	Hamilton,	5		Fishermen (?),	5 40		Thunberg.
	28	Hamlin,	1.5		P. S. & N. (?),	1 95	60	Swanson.
May	13	Lafayette,	?		B. R. & P. (?),			Johnson.
	13-14	Hamlin,	100	150	P. S. & N. R. R.,	16 05	10 50	Swanson.
	14-15	Lafayette,	30	250	Erie R. R.,	3 30	15 00	Shea.
	16	Norwich,	30		P. S. & N. R. R.,	8 30		Cummings.
	16-18	Sargent,	100		B. R. & P. R. R.,		13 20	McChesney.
	16-18	Norwich,	150		P. R. R.,	6 36	5 24	Evans.
	17	Norwich,	75		P. R. R.,	6 40		Cummings.
	18-19	Hamilton,	2		Unknown,	3 60		Thunberg.
	19	Lafayette,	?		Erie R. R.,			Johnson.
Nov.	6	Keating,	75		Children,	3 80	1 80	Cummings.
	7	Liberty,	10		Unknown,	4 50		Lewis.
	14	Eldred,	4		Unknown,	4 40		Clement.
	16	Keating,	50		Unknown,	4 50		Cummings.
			900.5	$743		$95 41	$67 78	
		MIFFLIN COUNTY.						
Mar.	26	Wayne,	25	25	Burning brush,		$26 30	Bodine.
	26	Wayne,	25	25	P. R. R. (?),		22 50	Bodine.
	26	Armagh,	?		P. R. R.,			Meek.
	26	Armagh,	?	1	P. R. R.,			Meek.
	26	Armagh,	1.5		P. R. R.,	$ 90	60	Meek.
	26	Armagh,	1.5		P. R. R.,		1 20	Meek.
	29-4/2	Granville,	250	500	Lumber R. R. (?),	25 50	1 20	Hough.
April	1 2	Derry,	300	75	Unknown,	31 35	5 35	Mertz.
	10	Decatur,	1.5		P. R. R.,			Kemberling.
	10	Granville,	12	350	Unknown,			Baltozer.
	11	Menno,	150	96	Burning brush,	20 03		Yoder.
	11	Bratton,	120	2,405	P. R. R.,	16 05	23 40	Morrow.
	18	Granville,	75	25	Unknown,		20 00	Boltozer.
	23	Bratton,	4	24	Unknown,	2 25	2 34	Kauffman.
	25	Union,	40	50	Burning brush,		38 65	Bietsch.
	26	Armagh,	8	8	Unknown,		1 74	Kerstetter.
	28	Armagh,	.5	1	P. R. R.,		16	Kerstetter.
	28	Armagh,	?		P. R. R.,			Kerstetter.
	28	Armagh,	.5	1	P. R. R.,		1 24	Kerstetter.
	28	Armagh,	1	1	P. R. R.,		3 20	Kerstetter.
May	2	Granville,	15	25	Burning brush,		9 00	Baltozer.
	15-22	Granville,	1,200	1,800	Unknown,	198 00		Hough.

(a) See Tioga county.
(b) See Union county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	16-22	Granville,	2,560	6,400	Incendiary,	443 25	38 50	Price.
	16-22	Derry,	2,500	4,250	Camp fire,	82 81	58 55	Warfield.
	17-18	Granville,	200	100	Unknown,		13 50	Baltozer.
	18-19	Oliver,	40	100	Sawmill.	20 25	19 65	Kirk-Sheerer.
	22	Menno,	?		Burning brush,	45		Bietsch.
Nov.	2	Armagh,	40	34	Hunters,	2 30	5 00	Warfield.
	8-10	Armagh-Derry,	300	195	Unknown,	27 85	2 40	Bell.
	10	Brown,	3	3	P. R. R.,	1 00	4 30	Warfield.
	15	Oliver,	.25	1	Hunter,	4 20		Rupert.
	16	Armagh,	60	4	P. R. R.,		40	Detz.
	19	Armagh,	.01		P. R. R.,		40	Detz.
	19-20	Decatur,	225	293	Unknown,	25 90		Kemberling.
			8,158.76	$16,792		$902 09	$299 58	
		MONROE COUNTY.						
Mar.	31	Barrett,	400	$600	Unknown,	$19 74		Springer.
April	1	Stroudsburg,	3	12	Unknown,	60		Sutton.
	1	Price,	1.5		Burning brush,		$3 00	Strobeck.
	1	Coolbaugh,	10	10	D. L. & W. R. R.,	3 40		Possinger.
	3	Paradise,	.5		D. L. & W. R. R.,			Shaller.
	4	Tobyhanna,	150	100	Unknown,	13 25	1 00	Miller.
	4	Paradise,	200	200	D. L. & W. R. R.,	4 50	7 20	Haase.
	4	Stroud,	3		D. L. & W. R. R.,	60	75	Sutton.
	4	Barrett (a),	1	1	Unknown,	1 65		Whittaker.
	4	Barrett,	500	260	Burning clearing,	10 05	4 50	Strobeck.
	5	Coolbaugh,	1	2	D. L. & W. R. R.,		1 00	Shaller.
	7	Jackson,	3		Burning grass,		4 35	George.
	8	Water Gap Boro.,	11	60	Unknown,			Sutton.
	10	Barrett,	3	10	D. L. & W. R. R.,		2 10	Whittaker.
	10	Barrett,	1		D. L. & W. R. R.,			Whittaker.
	10	Paradise,	1	2	D. L. & W. R. R. (?),	1 05	1 65	Shaller.
	10	Paradise,	100	100	D. L. & W. R. R. (?),	12 25		Price.
	10	Smithfield,	100	200	N. Y. S. & W. R. R. (?),	10 09	3 50	Wallace.
	10-11	Ross (b),	250	125	L. & N. E. R. R.,	4 65	24 00	Correll.
	11	Smithfield,	4	4	N. Y. S. & W. R. R. (?),	4 83	3 80	Wallace.

	11	Paradise,	5	5	D. L. & W. R. R.,	3 75		Detrick.
	11	Smithfield,	60	120	N. Y. S. & W. R. R.,	10 35	14 40	Wallace.
	11	Hamilton,	25	100	Unknown,	26 35	5 75	Brewer.
	11	Paradise,	100	200	D. L. & W. R. R. (?),	12 07	2 85	Fanseen.
	11	Coolbaugh,	1	5	Unknown,		50	Shaller.
	11	Coolbaugh,	2	4	D. L. & W. R. R.,	60	80	Shaller.
	15	Paradise,	3	3	Unknown,	60	1 60	Shaller.
	16	Barrett,	.25		D. L. & W. R. R.,		40	Whittaker.
	16	Tobyhanna,	.25		D. L. & W. R. R.,		20	DeHaven.
	17	Barrett,	.25		D. L. & W. R. R.,		65	Whittaker.
	17	Paradise,	6	6	D. L. & W. R. R.,	3 75		Detrick.
	17	Pocono,	6	6	D. L. & W. R. R.,	2 70	1 20	DeHaven.
	18	Coolbaugh,	.25		Unknown,		60	Shaller.
	18	Coolbaugh,	2	110	Burning brush,		7 20	Possinger.
	18	Paradise,	1.5		Burning brush,	7 20	1 40	Whittaker.
	19	Ross,	150		L. & N. E. R. R.,	12 60	15 00	Rayner.
	19	Ross,	200	100	L. & N. E. R. R. (?),	1 50	9 00	Correll.
	19	M. Smithfield,	10	5	Fisherman (?),	4 29	4 35	Strobeck.
	19	Tobyhanna,	1	1	D. L. & W. R. R.,		60	DeHaven.
	21	Paradise,	5	5	D. L. & W. R. R.,	1 60	3 25	Shaller.
	21	Barrett,	.5	1	D. L. & W. R. R.,		20	Whittaker.
	22	Stroud,	?		D. L. & W. R. R.,			Sutton.
	23	Paradise,	.25		Burning hotel,	7 35	1 05	Shick.
	23	Coolbaugh,	75	75	D. L. & W. R. R. (?),	15 15	4 25	Possinger.
	23	Paradise,	10	15	D. L. & W. R. R. (?),	2 40	4 50	Shaller.
	23	Barrett,	1		D. L. & W. R. R.,		1 50	Whittaker.
	24	Barrett,	?		Burning building,	3 80	60	Whittaker.
	25	Coolbaugh,	100		D. L. & W. R. R. (?),	11 75	18 00	Possinger.
	25	Coolbaugh,	1	25	D. L. & W. R. R. (?),	30	60	Shaller.
	28	M. Smithfield,	125	300	Unknown,	10 80	4 20	Miller.
	28	Barrett,	.75	2	D. L. & W. R. R.,		60	Whittaker.
	29	Tunkhannock,	200	100	Incendiary,	4 80	3 00	Everett.
	29	Barrett,	.5		D. L. & W. R. R.,		50	Whittaker.
	29	Barrett,	1.5	5	D. L. & W. R. R.,		50	Whittaker.
	29	Hamilton,	18	100	Unknown,	22 51	1 05	Clugston.
	29	Tunkhannock,	200	75	Unknown,	7 35	3 50	Everett.
	29	Tunkhannock,	400		Unknown,	41 75		Herman.
May	4	Barrett,	.12		D. L. & W. R. R.,		50	Whittaker.
	9	Barrett,	1	2	D. L. & W. R. R.,		90	Whittaker.
	11	Parad.-Poco.-Coolb.,	300	2,000	D. L. & W. R. R.,	140 30	1 20	Shick.
	11	Coolbaugh,	.5		D. L. & W. R. R.,		50	Shaller.
	12	Barrett,	3	5	D. L. & W. R. R.,		2 90	Whittaker.
	13	Paradise,	100	500	Burning rubbish,	62 34	10 00	Detrick.
	13-14	Tunkhannock,	200	200	D. L. & W. R. R.,	19 75	3 00	DeHaven.
	14	Ross,	450		L. & N. E. R. R.,	4 05	40 90	Rayner.
	14	Polk,	2	50	Unknown,	2 75		Snyder.
	14	Paradise,	2		D. L. & W. R. R. (?),	1 30	2 00	Shaller.
	14-15	Paradise,	67	5	D. L. & W. R. R.,	40 50	8 00	Fanseen.

(a) See Pike county.
(b) See Northampton county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
14-16	Tobyhanna,	100	100	W. B. & E. R. R.,	55 08	5 50	DeHaven.
14	Coolbaugh,	3	50	D. L. & W. R. R.,	7 05		Learn.
14	Barrett,	.12		Unknown,		90	Whittaker.
14	Coolbaugh,	150	150	Unknown,	14 25	15 75	Possinger.
14	Stroud,	.5		D. L. & W. R. R.,		60	Sutton.
15	Barrett,	6	12	Unknown,	1 80	60	Strobeck.
15	Barrett,	10	60	Unknown,	10 96		Springer.
15	Barrett,	25	35	D. L. & W. R. R.,		9 00	Whittaker.
15	Tunkhannock,	200		Unknown,	4 10		Herman.
15-16	Poco.-Stroud-Para.,	950	3,000	D. L. & W. R. R.,	96 67	49 50	Strobeck.
15-16	Paradise,	275	600	D. L. & W. R. R.,	45 06	45 00	Fanseen.
17	Tobyhanna,	150		Incendiary (?),	4 80	3 60	Everett.
19	Tunkhannock,	450		Incendiary (?),	3 25	1 00	Everett.
19	Tobyhanna,	10	10	W. B. & E. R. R.,	20 40	2 70	DeHaven.
19	Barrett,	2	5	D. L. & W. R. R.,		2 30	Whittaker.
19-21	Tobyhanna,	100		Unknown,		18 20	Majer.
19-21	Pocono,	800	835	W. B. & E. R. R.,	52 50	13 00	DeHaven.
20	Barrett,	15	90	Unknown,	8 55	80	Springer.
26	Pocono,	.5	1	D. L. & W. R. R.,	90	1 20	DeHaven.
26-27	Paradise-Barrett,	200	500	D. L. & W. R. R. (?),	20 50	25 00	Price.
Oct. 14	Coolbaugh,	.12		D. L. & W. R. R.,			Shaller.
17	Paradise,	.02		D. L. & W. R. R.,			Shaller.
Nov. 7-8	Barrett,	500	200	Unknown,	56 80	1 80	Price.
8	Pocono,	.5		D. L. & W. R. R.,	2 10	15	DeHaven.
9	Pocono,	.5	1	D. L. & W. R. R.,	1 40		DeHaven.
4	Pocono,	.5		D. L. & W. R. R.,		80	DeHaven.
5	Pocono,	1		D. L. & W. R. R.,		1 60	DeHaven.
6	Pocono,	.5	8	D. L. & W. R. R.,	1 00	40	DeHaven.
6	Pocono,	4	12	Hunter,	5 70	1 00	Clugston.
7-8	Pine-Barrett,	75	25	Unknown,	5 70		Strobeck.
8-9	M. Smithfield,	1,000	1,000	Unknown,	61 20		Mosier.
10	Coolbaugh,	75	75	Hunter	17 63		Possinger.
10	M. Smithfield,	1		Unknown,	1 80		Mosier.
11	Paradise,	2		D. L. & W. R. R.,	1 90		Shaller.
11	M. Smithfield,	175	75	Unknown,	17 30		Primrose.
12-13	Pocono,	8	3	D. L. & W. R. R.,			DeHaven.
13	Tunkhannock,			D. L. & W. R. R.,		20	DeHaven.
13	Pocono,	30	100	Hunters,	10 30		George.
14	M. Smithfield,	10	100	Incendiary,	6 10	5 00	Mosier.

	14	M. Smithfield,	150	500	Incendiary,	41 10		Mosier.
	17	Pocono,	10	20	Unknown,	9 50		Clugston.
	19	Pocono,	.5		D. L. & W. R. R.,	3 00	20	DeHaven.
Dec.	3	Barrett,			Hunters (?),		20	Arnst.
			10,066.38	$13,384		$1,162 47	$446 85	
		NORTHAMPTON COUNTY.						
April	1	Washington,	10		Burning brush,	$3 30	$ 60	Brodt.
	8	Bushk.-Plainf.,	100	$600	L. & N. E. R. R.,	4 35	18 50	Ackerman.
	4	U. Mt. Bethel,	.25		Incendiary (?),	45	30	Cooper.
	4	U. Mt. Bethel,	1.5		Incendiary (?),	8 90		Cooper.
	4	U. Mt. Bethel,	125	50	Unknown,	9 33		Lambert.
	9	Washington,	100	100	Unknown,	5 30	80	Lambert.
	10	Plainfield (a),	100	608	L. & N. E. R. R.,	3 00	37 40	Ackerman.
	10	U. Mt. Bethel,	25	5	Smoker,	4 48	1 00	Lambert.
	15	Washington,	70	70	Unknown,	11 50		Lambert.
	28	Washington,	23	120	Unknown,	7 45		Lambert.
	29	Washington,	388	1,000	Unknown,	9 45		Lambert.
May	2	Washington,	25	100	Unknown,	7 20	90	Lambert.
	17	U. Mt. Bethel,	67	70	Unknown,	20 36		Cooper.
	27	Lehigh,	40	200	Unknown,	24 75		Andrews.
Nov.	9-10	L. Saucon,	250		Unknown,	14 00		Boehm.
	10	U. Mt. Bethel,	5		Unknown,	2 96		Cooper.
	10	Washington,	20	100	L. & N. E. R. R.,	6 30	1 40	Lambert.
	11	Washington,	50	50	L. & N. E. R. R.,	6 00		Lambert.
	14-16	Wash.-U. Mt. Bethel,	1,000	200	Unknown,	58 04		Lambert.
	17	U. Mt. Bethel,	20		Unknown,	6 50		Lambert.
	19	Bushkill,	50	150	Unknown,	3 75	36 51	Ackerman.
			2,469.75	$3,420		$212 37	$96 91	
		NORTHUMBERLAND COUNTY.						
Mar.	26	Little Mahanoy,	1	$10	P. & R. R. R.,	$1 20	$ 60	Ferster.
	26-27	Jack. Mahanoy,	200	400	P. & R. R. R.,	46 20		Stepp & Ferster.
	27	Mt. Carmel,	11		P. & R. R. R.,	1 35		Smith.
	30	Coal,	70	140	Burning garbage (?),	25 95		Snyder.
April	1	Shamokin,	30		P. & R. R. R.,	13 50		Swank.
	3-4	Coal,	200	200	P. & R. R. R.,	21 25		Strausser.
	4	Shamokin,	12	60	P. & R. R. R.,	6 15		Snyder.
	7	Coal,	10	20	P. R. R.,	6 90		Snyder.
	9	L. Augusta,	1.5	9	P. R. R.,	45		Snyder.
	9-10	L. Mah.-Zerbe,	300	2,000	Unknown,	9 00	84 00	Machamer.
	9	Mt. Carmel,	10	10	P. & R. (?),	2 40		Maurer.
	9-10	Mt. Carmel,	50		Unknown,	7 80		Smith.
	10	Mt. Carmel,	40	40	P. & R. (?),	8 56		Maurer.

(a) See Monroe county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction. Fire Fund.	Cost of Extinction. Other Sources.	Warden.
10-11	Zerbe,	80	827	P. & R. R. R.,	5 40		Ferster.
10-11	E. Cameron,	800	500	Unknown,	20 10		Schleig.
11	Coal,	20	25	Unknown,	5 55		Strausser.
11-12	Rockefellow,	187		P. & R. R. R.,	33 80		Swank.
11-12	Coal,	40	20	Unknown,	9 60		Strausser.
12	L. Augusta,	20	20	Unknown,	3 00	2 70	Phillips.
12-14	W. Chillisqu.,	3,000	10,000	Incendiary,	5 40	270 00	Machamer.
13	L. Augusta,	.5	6	P. R. R. (?),	15		Snyder.
14-15	Cameron,	50	125	Unknown,	8 70		Maurer.
15	Mt. Carmel,	20		Unknown,	6 75		Smith.
15	Mt. Carmel,	12		P. R. R.,			Smith.
17	Mt. Carmel,	?		Boys,		4 00	Smith.
19	Coal,	20	40	Unknown,	6 00		Strausser.
22	Coal,	8	20	P. R. R.,	6 45		Snyder.
22	Ralpho,	4	5	P. R. R.,	3 00		Snyder.
22	Shamokin,	4	5	P. R. R.,	3 00		Snyder.
25	Coal,	150	50	Unknown,	11 25	13 80	Strausser.
25	Shamokin,	140		Unknown,	16 85		Swank.
29-30	Zerbe,	200	300	P. & R. R. R.,	6 30	68 64	Machamer.
May 12	Coal,	1		P. R. R.,	30	90	Snyder.
13-14	Zerbe,	150	150	Boys,	7 80		Machamer.
14	L. Augusta,	.01	8	P. R. R.,	2 25		Snyder.
14	Coal,	5	75	Unknown,	90	1 50	Strausser.
14-15	Washington,	100	500	P. & R. R. R.,	56 62	53 12	Heffelfinger.
14-15	Little Mahanoy,	200	1,000	P. & R. R. R.,	38 25		Ferster.
15	Mt. Carmel,	12		P. & R. R. R.,	1 80		Smith.
15	Mt. Carmel,	60		Unknown,	1 20		Smith.
15-16	Shamokin,	150		Unknown,	20 10		Swank.
16	Mt. Carmel,	40		Incendiary,	5 85		Smith.
17-18	Coal,	20	100	Unknown,	17 40		Strausser.
19	Shamokin,	20		Burning brush,	5 10		Swank.
19-21	Coal,	100	200	Unknown,	26 85	14 85	Strausser.
Oct. 28	Coal,	2	10	Unknown,	4 80		Strausser.
Nov. 1	Shamokin,			Hunters,	90		Swank.
7-8	W. Cameron,	700	800	Unknown,	39 60		Heffelfinger-Ferster.
7-8	Coal,	300	200	Loki,	17 40		MacNutt.
8-11	Zerby Coal,	6,000	6,000	Unknown,	45 80	138 00	Machamer.
9	Coal,	15		Loki,	3 82		MacNutt.

	10-11	Lower Mahoney,	5	100	Hunters,	10 20		Spotts.
	10	Coal,	15		Loki,	8 88		MacNutt.
	14	Coal,	2.5	15	Unknown,	3 30		Strausser.
	17	Coal,	50	100	Hunters,	7 00		Strausser.
	17	Lower Mahoney,	2	20	Unknown,	4 59		Spotts.
	18	Coal,	10	50	Hunters,	7 50		Strausser.
	19	Coal,	10	40	P. & R. R. R.,	5 50		Strausser.
			13,720.51	$24,200		$640 17	$652 11	
		PERRY COUNTY.						
Mar.	25	Miller,	.5		S. R. & W. R. R.,	$ 68		Houck.
April	1	Miller,	1		S. R. & W. R. R.,	91		Houck.
	10	Wheatfield (2),	1.12	$15	S. R. & W. R. R.,	2 10	$2 10	Burd.
	11	Miller,	475	2,200	Burning rubbish,	70 10	11 25	Houck.
	12	Wheatfield, (2)	1.15	15	S. R. & W. R. R.,	3 30		Burd.
	13	Rye,	300	600	Spark from chimney,	24 75	2 70	White.
	15	Centre,	.75	4	Unknown,	1 20	50	Myers.
	15	Penn,	4	30	Unknown,	2 40		Nickum.
	17	Madison,	10	43	Burning brush,	3 99	80	Smith.
	17	Centre,	1	4	S. R. & W. R. R.,	30		Houck.
	17	Miller,	2.5		S. R. & W. R. R.,	2 25		Houck.
	17	Centre,	35	500	N. S. & V. R. R.,	4 20	2 25	Dile.
	17-18	Jackson,	10	30	Unknown,	1 96	1 50	Sundy.
	18	Centre,	6	25	S. R. & W. R. R.,	5 01		Myers.
	18	Saville,	2	60	Saw mill,	15 81	2 25	Snyder.
	18	Saville,	2	50	Saw mill,	2 40	80	Snyder.
	22	Wheatfield (2),	.25		S. R. & W. R. R.,			Burd.
	23	Wheatfield,	.12		S. R. & W. R. R.,	15		Burd.
	25	Tyrone,	6		Unknown,	1 95	30	Cornman.
	29	Wheatfield,	.12		Unknown,	30		Burd.
May	2	Buffalo,	20	400	Burning briars,	10 02		Bair.
	14-18	Penn,	1,800	900	Burning brush,	346 08	150 00	Bates.
	15	Centre,	1.5	2	N. & S. V. R. R.,	4 05	1 80	Myers.
	15	Buffalo,	4	60	Burning brush,		10 50	Hebel.
	19	Centre,	40	410	N. & S. V. R. R.,	3 15	7 00	Dile.
	19-22	Jack.-Toboyne,	1,075	538	Unknown,	517 15	37 91	Smith.
	20	Saville,	10	305	Unknown,	7 50	1 05	Snyder.
Nov.	10	Penn-Rye,	525	1,100	Hunters,	21 37	9 45	Miller & White.
	12	Penn,		1	Hunters,	3 90		Miller.
	13	Rye,	4	60	Unknown,	5 40		Miller.
	29-30	Toboyne,	.25		Hunters,	9 35	1 54	Hart.
			4,338.61	$7,352		$1,071 73	$243 70	
		PIKE COUNTY.						
April	4	Green (a),	1,000	$533	Burning clearing,	$9 14	$5 45	Stadden.
	9	Lehman,	300	150	Burning brush,	11 55	8 25	Strobeck.
	10	Lehman,	500	300	Unknown,	43 05	4 15	Stout.

(a) See Monroe county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	13	Westfall,	30	75	Bonfire (boy),	2 40		Manwaring.
	15	Lehman,	40	120	Unknown,	9 15	1 50	Mink.
	16	Porter,	45	30	Fisherman (?),	4 20	6 74	Strobeck.
	17	Lehman,	250	300	Unknown,	39 75	3 60	Mink.
	18	Greene,	15	17	Unknown,	10 25		Gilpin, Jr.
	23	Milford-Westfall,	6	50	Unknown,	11 00	60	Drake.
	29	Porter,	150	300	Fisherman (?),	15 49	7 86	Strobeck.
May	11-12	Shohola,	200	50	Unknown (?),	17 00		Rosencrance.
	14-15	Westfall,	400	435	Erie R. R.,	13 45	1 05	Manwaring.
	17 18	Dingman,	600	1,200	Unknown,	18 15	2 60	Lord.
	18	Dingman,	400	400	Burning brush,	4 96		Kiesel.
	19	Westfall,	75	150	Unknown,	23 85		Manwaring.
	21	Shohola,	125	250	Incendiary (?),	11 40		Kiesel.
	25-26	Porter,	60	30	Fishermen (?),	3 00	9 60	Strobeck.
	26	Shohola,	300	700	Erie R. R.,		5 15	Bradford.
	26-27	Porter,	350	200	Unknown,	24 50	18 45	Strobeck.
Sept.	22-25	Lehman,	300	300	Unknown,	53 20	80	Stout.
Oct.	22	Dingman,	1	5	Burning auto,	5 30		Kiesel.
Nov.	8	Westfall,	50	15	Unknown,	11 70		Manwaring.
	9-10	Shohola,	1,600		Hunters,	25 20	80	Gebhardt.
	14	Westfall,	10		Smokers,	14 75		Drake.
	15	Shohola,	100		Unknown,	14 00		Rosencrance.
	18-19	Lehman,	500	150	Unknown,	43 67	4 00	Mink.
			7,407	$5,760		$440 10	$90 55	
		POTTER COUNTY.						
April	4	Sylvania,	20		Smoker (?),	$7 50	$4 50	Pierce.
	10-11	Sharon,	25	$615	N. Y. & P. R. R.,	2 40		Scoville.
	11	E. Fork Dist.,	.2		B. & S. R. R.,			Van Horn.
	11	E. Fork Dist.,	.1		B. & S. R. R.,			Van Horn.
	11	Portage,	20	20	Clearing land,	90	1 20	Fox.
	16	Keating,	30	10	Burning brush (?),	3 50	3 00	Fox.
	16-17	E. Fork Dist.,	25	4	Fishermen,	9 00	4 00	Golden.
	16-17	Stewardson,	8	1	Fishermen,	21 80	8 40	Caldwell.
	17	West Branch,	10		Unknown,	10 45		Leach.

	17	E. Fork Dist.,	.1		B. & S. R. R.,			Van Horn.
	17	Wharton,	1	2	B. & S. R. R.,		90	Williams.
	18	Wharton,	.1		Fishermen,		60	Williams.
	18	E. Fork Dist.,	1.5	3	B. & S. R. R.,	4 35	2 50	Robinson.
	18	Summit,	10	10	Unknown,		2 80	Ayers.
	18	Roulette,	1	3	Unknown,	3 90	1 50	Conrad.
	18	Allegany,	100	250	Unknown,	6 60	16 00	Emerick.
	18	Keating,	25	50	Burning brush (?),	3 00	1 20	Fox.
	18	Keating,	10	50	Clearing land,			Fox.
	18–19	Wharton,	40	100	Children,	24 35	1 50	Van Horn.
	18–19	Pike,	50		Burning brush,	6 60	6 60	Page.
	22	E. Fork Dist.,	.2		Fishermen,		40	Williams.
	22–23	Sweden,	30	40	Unknown,	8 60		Ayers.
	24	Wharton,	.3		B. & S. R. R.,		80	Williams.
	24	E. Fork Dist.,	.1		Fishermen,		20	Williams.
	25	Allegany,	25	50	Unknown,	3 30		Mosch.
	25	Allegany,	15	10	Unknown,	2 85	5 60	Woodcock.
	25–28	E. Fork Dist.,	100	100	Unknown,	11 25	5 40	Caldwell.
	25–28	E. Fork Dist.-Wharton,	600	1,000	Incendiary,	32 10	3 50	Van Horn.
	28	Stewardson,	2	1	Unknown,	1 50	90	Caldwell.
May	3	Stewardson,	100	305	Unknown,	15 30	7 00	Gilden.
	11	Galeton Boro.,	4	5	Unknown,	11 40		Leach.
	11	Eulalia,	5	8	C. & P. A. R. R.,		6 60	Emerick.
	13	Roulette,	1	5	Boys,	4 00	1 50	Conrad.
	14	E. Fork Dist.,	.1		B. & S. R. R.,			Van Horn.
	14	Wharton,	.5		B. & S. R. R.,		40	Van Horn.
	14	Eulalia,	2	10	C. & P. A. R. R.,		6 70	Matteson.
	14–15	Ulysses,	30		B. & S. R. R.,	11 80		Wright.
	14–16	Pike-Ulysses,	30	300	Unknown,	16 00		Leach.
	15	Eulalia,	?	1	C. & P. A. R. R.,		1 90	Emerick.
	15	Eulalia,	10	25	Camp fire,		8 85	Emerick.
	15–16	Abbott,	10	10	Clearing land,		3 25	Golden.
	15–16	West Branch,	40	20	B. & S. R. R.,	29 37	25 90	Van Horn.
	16	Keating,	5	60	B. & S. R. R.,	2 50	1 20	Fox.
	16	Summit,	.5		Burning logs,		1 68	Ayers.
	16	West Branch,	.2		B. & S. R. R.,		40	Van Horn.
	16	Eulalia,	4	110	Burning brush,	8 50	1 50	Matteson.
	16–17	Stewardson,	75	20	Smoker,	17 65	6 75	Golden.
	17	E. Fork Dist.,	.1		B. & S. R. R.,			Van Horn.
	17	Summit,	.2		B. & S. R. R.,		40	Van Horn.
	17	Allegany,	2	4	C. & P. A. R. R. (?),	1 80		Woodcock.
	17	East Fork Dist.,	1		B. & S. R. R.,	1 98	3 20	Van Horn.
	20	Allegany,	3		Unknown,	60		Woodcock.
	23	Abbott,	10		Clearing land,	3 00		Bratz.
	26	Allegany,	1	1	Unknown,			Woodcock.
Sept.	23	Sweden,	15	15	Burning fallows,	1 80	30	Wells.
	27	Eulalia,	.5	3	C. & P. A. R. R.,	1 80		Matteson.
Nov.	13	Eulalia,	10	10	Clearing land,		5 80	Emerick.
			1,509.7	$3,231		$291 45	$154 63	

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		SCHUYLKILL COUNTY.						
Mar.	22	Butler,	?		P. R. R.,			Conner.
	25	Norwegian,	20		Unknown,	$3 60		Seiders.
	26	E. Norwegian,	75	$25	St. Clair Coal Co.,	36 00		Weiss.
	26	W. Penn,	.5		L. V. R. R.,			Burkey.
	26	W. Penn,	.25		L. V. R. R. (?),			Burkey.
	26	W. Penn,	18	75	Burning weeds,	1 80	$0 60	Burkey.
	30	W. Penn,	5		P. & R. R. R.,	1 80	60	Burkey.
	31	W. Penn,	2	25	L. V. R. R. (?),	60	30	Burkey.
April	1	W. Mahonoy,	20	100	Unknown,	11 55	6 49	Dawes.
	2	Union,	35	185	Unknown,	5 40		Dawes.
	3	Union,	2.5	15	Unknown,	90	1 98	Dawes.
	3	W. Norwegian,	25		P. R. R.,	8 40		Weiss.
	4	W. Penn,	.5	10	L. V. R. R.,	1 20		Burkey.
	4	W. Brunswick,	100	200	Unknown,	8 55		Moyer.
	4-5	W. Penn,	25	100	L. V. R. R. (?),	3 00		Burkey.
	4-5	Schuylkill-Ryon,	200		Unknown,	2 10		Ellis.
	5	E. Norwegian,	15	50	St. Clair Coal Co.,	9 00		Weiss.
	6	Butler,	?		P. & R. R. R.,			Conner.
	9	N. Manheim,	3		P. & R. R. R.,	90		Seiders.
	9	Kline,	100	100	Unknown,	4 50		Bruno.
	9	Butler,	1	10	Boys,	3 60	2 13	Dawes.
	9-12	Butler,	20	160	Unknown,	5 40	4 24	Dawes.
	10	W. Penn,	4	25	L. V. R. R. (?),	90		Burkey.
	10	Branch,	50		P. & R. R. R.,	1 20	5 00	Seiders.
	10	W. Penn,	15	100	L. V. R. R.,	1 80		Burkey.
	10	St. Clair-New Castle,	4	150	P. R. R.,	14 40		Weiss.
	10	Butler,	?	100	Unknown,	18 15		Conner.
	10	E. Norwegian,	20		Mt. Hope Coal Co.,	9 00		Weiss.
	10	E. Norwegian,	?		Coal company engine,			Weiss.
	10-11	Walker,	200		P. & R.,			Wirt.
	10-11	W. Penn,	158	1,000	Unknown,	24 90	2 10	Burkey.
	10-11	E. Norwegian,	25	100	Unknown,	31 90		Weiss.
	10-11	Branch,	75		L. V. R. R.,	7 50		Seiders.
	1	Ashland borough,	10	20	P. & R. R. R.,	3 45	50	Conner.
	11	Ashland borough,	6.5	10	P. & R. R. R.,	4 80		Conner.
	11	Mahanoy,	20		Unknown,	25 05		Samuels.

	11	W. Mahanoy,	1	6	L. V. R. R.,	2 40	1 41	Dawes.
	11	W. Mahanoy,	2	30	Unknown,	1 35	1 23	Dawes.
	11	Butler,	200	200	P. & R. R. R. (?),	13.90		Conner.
	11	W. Penn,	.5	5	L. V. R. R.,	30		Burkey.
	11	Ryon,	20		P. & R. R. R.,			Ellis.
	11-12	Tremont,	300	800	P. & R. R. R.,	37 80		Gibson.
	11-12	Union (a),	100	25	Unknown,	2 60		Shoup.
	12	Union,	·6	475	Unknown,	1 20	4 50	Shoup.
	12	W. Penn,	5		L. V. . R.,	4 20		Burkey.
	13	Mahanoy,	2	20	Unknown,	3 00	4 24	Dawes.
	14	Ryon,	30	50	Incendiary,	5 40	1 35	Ellis.
	14	W. Penn,	2		Unknown,	1 80		Burkey.
	14-15	Porter,	350	250	Boys (?),	28 20		Carl.
	16	W. Penn,	2		L. V. R. R.,	2 25		Burkey.
	16	W. Penn,	1		L. V. R. R.,	1 05		Burkey.
	17	W. Penn,	1.5	50	L. V. R. R.,	1 80		Burkey.
	17	W. Penn,	4	12	L. V. R. R.,	2 55		Burkey.
	17	N. Manheim,	50		Unknown,	10 35		Guers.
	17	Cass,	10		Unknown,	7 20		Watts.
	17 18	Kline,	1,000	2,000	Unknown,	22 65		Bruno.
	19 20	Norwegian-Blythe,	75	500	Mill Creek Coal Co.,	34 40		Weiss.
	21	W. Mahanoy,	20	160	Unknown,	15 15	82	Dawes.
	22	Rush,	10	25	Unknown,	9 85		Miller.
	22 23	New Castle,	100	1,000	P. & R. R. R.,	36 60		Weiss.
	23	W. Mahanoy,	40	128	Unknown,	3 30	2 12	Dawes.
	23	Kline,	100	200	Unknown,	4 50		Bruno.
	24	Union,	200	50	Unknown,	25 50	4 50	Shoup.
	25	W. Mahanoy,	10	70	Unknown,	3 90	69	Dawes.
	25-26	Blythe-E. Norwegian,	150	600	Unknown,	27 00		Weiss.
	28-29	Butler,	80	450	Boys,	29 25		Dawes.
	28-29	W. Mahanoy,	35	90	Unknown,	4 80		Dawes.
	29	Kline,	500	500	Unknown,	13 50		Bruno.
	29	Butler,	?		P. & R. R. R.,	2 20		Conner.
	30	S. Manheim,	300	60	Unknown,	9 60		Helm.
May	3	S. Manheim,	60	575	P. & R. R. R.,	8 40		Helm.
	3-4	Walker,-	100		Unknown,	4 50	5 00	Kershner.
	4	Kline,	350		Unknown,	7 20		Klingerman.
	5-6	Blythe,	5	30	Unknown,	7 00		Devine.
	10	N. Manheim,	5		P. & R. R. R.,	1 20		Seiders.
	10	N. Manheim,		?	P. & R. R. R.,			Wagner.
	11	Blythe,	25		P. & R. R. R. (?),	9 15		Guers.
	11	W. Penn,	1		L. V. R. R.,	45		Burkey.
	12	Mahanoy-Ryon,	150	100	Unknown,	4 53		Ellis.
	12	W. Mahanoy,	5	15	Unknown,	2 70	52	Dawes.
	13 15	Butler,	1,058	4,232	Unknown,	29 55	16 93	Dawes.
	14	Butler,	5	25	Unknown,	5 70	3 96	Dawes.
	14	E. Norwegian,	10		P. & R. R. R.,			Wagner.
	14	Ryon,	20		P. & R. R. R.,	2 10		Ellis.
	14	Walker,	15		P. & R. R. R.,	90	1 80	Kershner.

(a) See Columbia county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
14	Schulkill,	5		P. & R. R. R.,	60	90	Kershner.
14	Schuylkill,	100		P. & R. R. R.,	6 50		Kershner.
14	W. Penn,	2	20	L. V. R. R.,	1 65		Burkey.
15	N. Union,	15		Unknown,	6 60		Wharmby.
15	W. Penn,	5	40	Unknown,	7 50		Burkey.
15	Wayne,	41	450	P. & R. R. R.,	16 83		Schaeffer.
15	N. Manheim,	80		Unknown,	7 50		Guers.
15–16	Blythe,	320		Unknown,	55 80		Guers.
17	Ryon,	3	100	Boys (?),	7 50		Ellis.
17–18	Butler,	300	200	Burning brush,	56 60		Conner.
17–19	W. Penn, (b)	500	1,500	Unknown,	61 80	10 00	Burkey.
18	W. Penn,	3	5	Unknown,	2 40		Burkey.
19	Black Creek,	275		Unknown,	15 15		Wharmby.
19	Butler,	60	325	Unknown,	12 70		Conner.
19	Ryon,	1.5		P. & R.,		1 50	Ellis.
19	W. Penn,	?	2	L. V. R. R.,			Burkey.
19–21	E. & N. Union,	650	200	Burning brush,	67 05		Wharmby.
20	Ashland,	3	20	Unknown,	3 60		Conner.
21	Schuylkill,	10		Unknown,	5 25		Kershner.
25	W. Penn,	2	20	L. V. R. R.,	1 95		Burkey.
26–27	Schuylkill,	100		Maryland Coal Co.,	11 25		Kershner.
26–27	Pine Grove,	200	3,600	Burning sawmill,	64 30	15 00	Gibson.
26–27	S. Manheim,	25	250	Unknown,	3 75		Helm.
June 1	E. Norwegian,	50	50	Unknown,	14 40		Weiss.
Nov. 7	W. Brunswick,	100	1,000	P. & R. R. R.,	8 10		Moyer.
8	Blythe,	60		Unknown,	12 30		Guers.
9–10	Fremont,	400	600	P. & R. R. R.,	16 40		Minnick.
8–11	Union (a),	1,500	2,250	Unknown,	76 70		Shoup.
10	Barry,	70	70	Boys,	15 38		Maurer.
11–12	Frailey,	500	200	P. & R. R. R.,	11 30		Minnick.
12–13	Union,	100	250	Unknown,	21 50		Shoup.
13	Ryan,	1		P. & R. R. R.,			Ellis.
13	Butler,	40	30	Unknown,	13 30		Maurer.
14	Fremont-Riley,	300	400	P. & R. R. R.,	4 20		Minnick.
15	Frailey,	500	200	Unknown,	14 30		Minnick.

	15	Rahn,	260	300	Unknown,	53 30		Miller & Neumiller.
	17-18	W. Penn,	8	180	Hunters,	40 00		Miller.
			13,360.75	$27,655		$1,422 32	$100 81	

SNYDER COUNTY.

Feb.	27	W. Beaver,	2.5		P. R. R. (?),	$1 20	$5 60	Marks.
Mar.	31/4-1	W. Beaver,	120		Unknown,	18 90		Gross.
April	4-5	W. Beaver,	100		Unknown,	14 20		Marks.
	11	Washington,	90		Unknown,	23 82		Heim.
	11	Perry,	20	$14	Unknown,	16 55		Amig.
	17	Franklin,	16	240	P. R. R.,	16 50	7 50	Reigle-Brunner.
May	14	Franklin,	15	430	P. R. R.,	15 85	6 00	Reigle.
	21	Adams,	3		Unknown,	8 25	1 50	Bartschat.
			366.5	$684		$115 27	$20 60	

SOMERSET COUNTY.

Mar.	25	Block,	10	$100	B. & O. R. R. (?),	$2 10		Baker.
	26	Quemahoning,	.1		B. & O. R. R.,	15		Brant.
	29	Northampton,	50		B. & O. R. R.,	2 05	$2 40	Beachy.
	31	Benson borough,	2		Unknown,		4 20	Benson.
	31	Quemahoning,	.1		B. & O. R. R.,	30		Brant.
	31	Quemahoning,	3		B. & O. R. R. (?),	60		Brant.
	31	Quemahoning,	12		B. & O. R. R.,	2 85		Brant.
	31	Quemahoning,	.3		B. & O. R. R., (?),	15		Brant.
April	1	Somerset,	3	15	Unknown,		50	Berkebile.
	1 2	Northampton,	75		B. & O. R. R.,	5 00	6 05	Beachy.
	3	Block,	35	835	W. M. R. R. (?),	6 00		Baker.
	4	U. Turkey Foot,	50	13	Unknown,	1 20		Weimer.
	14	Fair Hope,	75	50	Unknown,		3 85	Browning.
	15	Brothers Valley,	4		Unknown,	4 20		Miller.
	16	Block,	19	11	B. & O. R. R.,	1 73		Baker.
	17	Addison,	45	50	W. M. R. R.,	5 55	2 25	Merrill.
	17	Shade,	2		Unknown,	1 58		Manges.
	17	Quemahoning,	3		B. & O. R. R. (?),	90		Brant.
	18	Quemahoning,	.1		B. & O. R. R. (?),	15		Brant.
	18	Quemahoning,	1.5	3	B. & O. R. R. (?),	60		Brant.
	20	Allegheny,	5	50	Unknown,	6 45	45	Tapper.
	21	Quemahoning,	.5		B. & O. R. R. (?),	15		Brant.
	22	Somerset,	3		B. & O. R. R. (?),	1 80		Brant.
	22	Larimer-Greenville,	10	20	W. M. R. R.,	12 35	2 75	Baer.
	22 23	Addison,	139	150	Unknown,	23 25		Merrill.
	22 23	Stony Creek,	40		Unknown,	55 85		Foy.
	23	Quemahoning,	.05		B. & O. R. R. (?),	45		Brant.
	23	Paint,	100		P. & R., (?),	9 00		Hummel.

(a) See Columbia county.
(b) See Lehigh county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	23	Shade,	25		McNeal's R. R. engine,	75		Wechtenheiser.
	23	Elk Lick,	10	25	Lumber engine,		11 10	Kretchman.
	26	Quemahoning,	.25		B. & O. R. R. (?),	90		Brant.
	28	Jefferson,	7		Logging engine (?),	2 25		Moore.
May	5	Quemahoning,	.05	1	B. & O. R. R. (?),	60		Brant.
	14	Middle Creek,	20	200	Logging engines (?),	3 90		Barron.
	15	Paint,	25	40	P. R. R.,	6 90		Holsopple.
	15	Quemahoning,	.5	3	B. & O. R. R., (?),	90		Brant.
	15	Shade,	2		Unknown,	2 25		Manges.
	15-16	Stony Creek,	2	25	B. & O. R. R.,	4 50		Brant.
	15-16	Shade,	40		Burning brush,	4 05	6 75	Wechtenheiser.
	15 19	Ogle (a),	500		Unknown,			Miller.
	16	Quemahoning,	?		B. & O. R. R.,	2 40		Brant.
	16	Jefferson,	120	238	Logging engine,	13 35		Moore.
	16	Ogle,	100	100	Sawmill engine,		10 05	Whitaker.
	17	Jefferson,	80	326	Unknown,	1 20		Moore.
	17-18	Ogle,	200	2,000	Unknown,	28 20	3 00	Whitaker.
	18	Elk Lick,	.5	10	Logging engine,		2 48	Kretchman.
	18	Middle Creek,	125	13	Unknown,	25 20	3 60	Barron.
	18	Northampton,	22	1,419	Unknown,	23 34	1 35	Beachy.
	18-19	Middle Creek,	400	3,000	Unknown,	18 85		Barron.
	18-19	Summit-Greenville,	600	2,225	Burning brush,	126 80		Baer.
	18-20	Jefferson,	2,000	6,520	Logging engine,	317 55	13 00	Moore.
	18-21	Addison,	3,000	2,865	Smokers (?),	163 15	63 00	Merrill.
	19	Ogle,	200	25	Unknown,	26 10		Whitaker.
	19	Stony Creek,	2	25	B. & O. R. R.,	3 80		Brant.
	19	Paint,	30	50	B. & O. R. R.,	11 55		Benson.
	19	Middlecreek,	100	500	Incendiary,	22 95	2 25	Barron.
	19-20	Elk Lick-Summit,	100	765	Unknown,	76 05	7 20	Kretchman.
	19-20	Quemahoning,	2	3	B. & O. R. R. (?),	1 50		Brant.
	19-20	Northampton,	90	670	Unknown,	50 75	5 10	Beachy.
	19-21	Shade,	80		Unknown,	14 15		Manges.
	20-21	Southampton-Northampton,	80	1,375	Unknown,	35 75		Troutman.
	22	Stony Creek,	1.5		B. & O. R. R. (?),	2 70		Brant.
	26	Stony Creek,	4	11	B. & O. R. R. (?),	90		Brant.
	29/6-1	Elk Lick,	500	500	Unknown,	13 65		Stevanus.
Nov.	6	Addison,	15		Unknown,	60	4 20	Merrill.
	6	Quemahoning,	1		B. & O. R. R.,		20	Brant.

	7	Southampton,	16	10	Hunters,	4 10		Troutman.
	9	Northampton,	70		B. & O. R. R.,	11 00	8 40	Beachy.
	9	Northampton,	100		Hunters,	13 00		Brick.
	9 10	Allegheny,	8	200	Unknown,	28 30	2 00	Brick.
	11	Northampton,	35	5	Hunters,	7 40		Beachy.
	12	Greenville,	8	100	Incendiary,	9 50		Baer.
	14	Paint,	25		Unknown,	12 00		Hummel.
	18-19	Northampton,	10		B. & O. R. R.,	4 05		Beachy.
	19-20	Southampton,	300	600	Unknown,	61 50		Troutman.
	20	Northampton,			False alarm,	1 75		Beachy.
	20	Quemahoning,	.25		Smokers,	1 38	60	Brant.
	20	Jefferson,	.5		B. & O. R. R.,			Moore.
	20	Black,	50	750	B. & O. R. R.,	11 50		Baker.
	20	Black,	100	1,000	B. & O. R. R.,	7 50		Baker.
	20	Addison,	25	55	Wash fire,	6 80		Merrill.
			9,905.2	$26,910		$1,330 89	$166 73	

SULLIVAN COUNTY.

Mar.	26	Cherry,	1		L. V. R. R.,			Morter.
	30	Cherry,	60		Unknown,	$4 00		Morter.
April	4	Cherry,	36		Burning brush,	3 45		Morter.
	17	Elkland,	4	100	Burning brush,	3 00	$3 00	More.
	17	Davidson,	.5		W. & N. B. R. R.,	2 10		Gorman.
	17-18	Fox,	75	75	Fishermen (?),	24 00	3 60	Frey.
	17-19	Laporte,	40	150	W. & N. B. R. R.,	48 05	2 70	Gorman.
	17-19	Cherry,	200		L. V. R. R.,	23 25	12 60	Morter.
	18	Colley,	200	25	L. V. R. R.,	3 00		Morter.
	18-19	Colley,	500	18	Clearing land,	14 10	1 05	Behr.
	22-23	Cherry,	70		Unknown,	6 00		Morter.
	22-23	Cherry,	150	15	Incendiary,	25 20		Morter.
	25	Laporte,	20	150	Smoker (?),			Ingham.
	25	Fox,	50	50	S. & N. Y. R. R.,	3 80		Baxter.
	28 29	Laporte,	35	6	W. & N. B. R. R.,	21 90	4 20	Gorman.
	29	Davidson,	1	10	Unknown,	3 90		Hess.
	29	Cherry,	30	5	Unknown,	11 55		Morter.
May	3	Laporte,	2	10	W. & N. B. R. R.,	7 20	1 20	Gorman.
	3	Laporte,	.5		W. & N. B. R. R.,			Ingham.
	4	Laporte,	1	5	Unknown,	1 95	45	Peterman.
	4	Davidson,	2	10	Unknown,	4 45		Peterman.
	4	Laporte,	.75		Unknown,			Ingham.
	11	Laporte,	3	15	W. & N. B. R. R.,	7 20		Gorman.
	14	Laporte,	1	10	W. & N. B. R. R.,	10 25		Gorman.
	14	Laporte,	.25		Unknown,			Ingham.
	14-16	Hillsgrove,	75		Unknown,	45 20	6 00	Brey.
	15	Laporte,	1		Unknown,			Ingham.
	15-16	Laporte,	150		Unknown,		59 25	Laird.
	15-16	Cherry,	100		L. V. R. R.,	13 80		Morter.

(a) See Somerset county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.	Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
					Fire Fund.	Other Sources.	
16 17	Cherry,	150	35	L. V. R. R.,	13 65	1 50	Morter.
17-18	Cherry,	75	20	Unknown,	6 00		Morter.
17-18	— ——,	2		W. & N. B. R. R.,	4 80		Morter.
18 19	Cherry,	40	5	L. V. R. R.,	3 30	75	Morter.
19	Laporte,	75	375	W. & N. B. R. R.,	27 45	4 80	Gorman.
19 20	Shrewsbury,	10	50	Smoker (?),	9 00		Smith.
19 20	Cherry,	300	215	L. V. R. R.,	14 70		Morter.
26 27	Colley,	40		L. V. R. R.,	7 50		Morter.
Nov. 11	Cherry,	4		L. V. R. R.,	3 80		Morter.
18-19	Davidson,	50		Unknown,	17 35	3 00	Morter.
		2,555	$1,354		$393 80	$103 50	
	SUSQUEHANNA COUNTY.						
April 4	Great Bend,	5		Burning brush,		$1 45	Simrell.
17	Clifford,	.5		Smoker (?),		90	Burns.
25	Auburn,	10		Unknown,	$10 50	1 20	Kerman.
May 13	Oakland,	20	50	Unknown,	4 20		Van Antwerp.
19	Lathrop,	10	20	Unknown,	7 80		Williams.
Nov. 11	Great Bend,	.25		Smokers,	40		Simrell.
14	Bridgewater,	1		D., L. & W. R. R.,			Simrell.
20	Jessup,			Smokers,			Simrell.
		46.75	$70		$22 90	$3 55	
	TIOGA COUNTY.						
Mar. 26	Jackson,	3	20	Erie R. R. (?),	3 15		Dailey.
26	Duncan,	12	12	Eire R. R. (?),	3 15		Beagle.
26	Bloss,	12	10	Unknown,	9 90		Estep.
26 27	Middlebury,	30	200	Smoker (?),	17 38	4 20	Davis, Jr.
30	Morris,	.25	1	Erie R. R. (?),	1 20		Beagle.
April 4	Hamilton,	4		N. Y. C. R. R.,	4 05		Higland.
9	Morris,	.25		Erie R. R.,		90	Beagle.
10 11	Morris,	100	100	Erie R. R.,	17 55	1 50	Beagle.
11	Morris,	1	10	Smoker (?),	75		Fish.
11	Morris,	1	6	N. Y. C. R. R. (?),	1 50		Fish.

	11-12	Covington,	100	25	Erie R. R. (?),	7 15	2 40	Jackson.
	17	Shippen,	175	100	Unknown,	2 55	3 60	Port.
	18	Hamilton,	385	50	Fisherman (?),	10 35	4 50	Higland.
	18	Delmar,	50	10	N. Y. C. R. R. (?),	8 40	22 45	Lawton.
	21	Ward,	5	5	Unknown,	6 00		Austin.
	22	Duncan,	10	75	Boys,	2 25	1 50	Howe.
	22	Shippen,	12.5	25	Unknown,	6 75	2 75	Mulford.
	22	Middlebury,	25	300	Boys (?),	23 50	3 60	Davis, Jr.
	22-23	Tioga,	200	300	Boys (?),	23 10		Kimball.
	25-26	Jackson,	175	255	Erie R. R. (?),	6 90	1 80	Dailey.
	25-26	Lawrence,	200	100	N. Y. C. R. R. (?),	2 85	8 40	Callahan.
	28-29	Delmar,	10	5	N. Y. C. R. R. (?),	4 65		Lawton.
	29	Duncan,	75	100	N. Y. C. R. R.,	17 25		Howe.
May	2	Gaines,	5	5	Sawmill,	1 50		Schoonover.
	14 16	Elk,	50	50	Leetonia R. R.,		22 50	Harbeson.
	15	Hamilton,	3		Erie R. R. (?),		1 50	Higland.
	15-16	Osceola,	350	700	Brush burning,	63 15	2 25	Brown.
	15 16	Ward,	200	150	Unknown,	14 40		Austin.
	15 16	Ward,	150	150	Unknown,	11 40		Austin.
	15 16	Gaines,	15	50	Sawmill,	3 15		Schoonover.
	16 19	Morris (a),	200	266	Incendiary (?),	19 85	90	Harbeson.
Nov.	10 12	Liberty,	300	500	Hunters,	73 50		Werline.
	10	Delmar,	35	26	N. Y. C. R. R.,	6 30	12 00	Mulford.
			2,804	$3,606		$371 43	$96 75	

UNION COUNTY.

Mar.	26	Hartley,	.12		P. R. R.,		$0 15	Libby.
	26	Hartley,	.12		P. R. R.,		15	Meek.
	26	Hartley,	4	4	P. R. R.,	$1 80		Libby.
April	3	Hartley,	.06		P. R. R.,		15	Libby.
	16	Lewis,	25	250	Smoker (?),	15 50	5 00	Winter.
	29	Hartley,	10	25	Smoker (?),	5 00	90	Silvius.
	30	Hartley,	.5	1	Smoker (?),	70	1 60	Silvius.
May	2	Hartley,	28	56	P. R. R.,	3 90	7 80	Libby.
	3	Hartley,	.25		P. R. R.,	2 25	30	Libby.
	3	Hartley,	.5	1	P. R. R.,	60	90	Libby.
	13	White Deer,	6	50	Smoker (?),	5 95	1 50	Metzger.
	13	Hartley,	4	10	Incendiary (?),	6 13	2 50	Silvius.
	17	Hartley,	22	66	P. R. R.,	4 80	2 20	Libby.
	17	Hartley,	12	100	P. R. R.,	1 80		Snyder.
	17 21	White Deer-Gregg (a),	2,940	2,735	Unknown,	444 10		Baer.
June	4	Hartley,	1	8	Incendiary (?),			Silvius.
Sept.	1	White Deer,			Lightning,		90	Depo.
	15	White Deer,	.02		Hunters,	2 10		Depo.
Nov.	15 16	West Buffalo,	350	700	Hunters (?),	72 00	6 00	Winters.
			3,403.57	$4,001		$567 55	$29 15	

(a) See Lycoming county.

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
		VENANGO COUNTY.						
April	16	Sugar Creek,	10		Burning brush,		$13 05	Leach.
	17	Cranberry,	?		P. R. R.,			Leach.
May	14-17	Victory,	933	6,000	L. S. & M. S. R. R.,	33 75		Witherup.
June	7	Oil Creek,	50	25	Unknown,	1 00	60	Fitts.
			993	$6,025		$35 35	$13 65	
		WARREN COUNTY.						
April	11	Conewango,	15		N. Y. C. R. R. (?),	$1 80	$1 20	Vollentine.
	11	Brokenstraw,	13.5		N. Y. C. R. R. (?),	2 70		Vollentine.
	12	Deerfield,	.5	10	P. R. R.,	1 28		Cross.
	12	Deerfield,	25	10	Burning brush,	1 80	75	Cross.
	17-18	Triumph,	50	50	P. R. R.,		3 90	Anderson.
	18	Deerfield,	10	10	P. R. R. (?),	4 50	3 00	Anderson.
	18	Southwest,	300		Unknown,	15 45	2 40	Allison.
	25	Deerfield,	65	50	P. R. R.,	4 65	4 50	Cross.
	28-29	Freehold,	65	310	Erie R. R.,	5 70		Chapman.
	29	Limestone,	40		Unknown,	7 95	45	Averill.
May	15-16	Deerfield,	100	150	Unknown,	6 00		Sutton.
	16-17	Triumph,	300	600	P. R. R. (?),	6 25	21 75	Anderson.
	16-17	Sheffield,	3		Unknown,	5 70		Thunberg.
Nov.	9	Deerfield,	30	100	Hunters,	6 65		Anderson.
			1,017	$1,290		$70 43	$37 95	
		WAYNE COUNTY.						
Mar.	31	Waymart borough,	5	$50	Burning brush,	$2 33		Denk.
April	3	Dreher,	70	50	Burning grass,	11 90	$2 40	Jones.
	4	Waymart borough,	30		D. & H. R. R.,	9 75		Denk.
	4	Cherry Ridge,	10	30	Erie R. R. (?),	4 20		Collins.
	10	Cherry Ridge,	12	10	Erie R. R. (?),	3 75		Collins.
	18-19	Salem,	15	150	Unknown,	8 95	90	Walker.
	24-26	Paupack,	300	200	Unknown,	70 20		Daniels.
	24-25	Pauoack,	350	100	Unknown,	20 10		Collins.

	29	Paupack,	6	25	Burning brush,		22 10	Daniels.
	29	Paupack,	50	100	Unknown,	10 50		Collins.
May	18	Cherry Ridge,	200	275	Incendiary,	9 15	1 20	Collins.
	19	Cherry Ridge,	454	1,100	Unknown,	33 60	2 55	Collins.
	19-21	Paupack,	69	200	Unknown,	52 45		Daniels.
	20-21	Cherry Ridge,	50	150	Unknown,	7 50		Collins.
	21	Dreher,	20	20	Unknown,	10 50		Jones.
	21	Cherry Ridge,	30	105	Unknown,	8 40		Collins.
	26	Clinton,	10	100	Unknown,	16 50		Cowperthwaite.
June	4	Palmyra,	2	20	Unknown,	5 40		Schlosser.
Nov.	14-15	Paupack,	50		Hunters,	16 90		Daniels.
			1,724	$2,685		$302 08	$29 15	
		WESTMORELAND COUNTY.						
Mar.	18	Derry,	2	$4	Unknown,	$1 65	$1 20	Shanefelter.
	24	Derry,	.75	3	P. R. R.,	90		Schwalm.
	26	Derry,	1	8	P. R. R.,	60		Schwalm.
	26	Fairfield,	8	25	Dynamiting,	8 10		Frain.
	26	Derry,	7	21	P. R. R.,	1 50	1 50	Schwalm.
	26	N. Huntingdon,	10		Unknown,	21 55		Penman.
	28	Derry,	2	4	P. R. R. (?),	1 20		Schwalm.
	28	Derry,	.25		P. R. R.,			Schwalm.
	31	Allegheny,	25		Boys,	9 38		Fitzgerald.
April	4	Sewickley,	35	75	B. & O. R. R. (?),	1 50		Messner.
	5 6	Rostraver,	10	75	Unknown,	1 20		Shepler.
	11	Derry,	6	27	Burning brush,	3 69	1 20	Shanefelter.
	13	Derry,	?		P. R. R.,			Schwalm.
	17	Fairfield,	9	20	Burning weeds,	9 60		Frain.
	18	St. Clair,	336	840	P. R. R. (?),	18 95	35 00	Weller.
	22	St. Clair,	9	45	P. R. R. (?),	12 00		Weller.
	25	Fairfield,	2		Unknown,	2 40		Frain.
May	3	Derry,	5	10	P. R. R.,	1 85	2 10	Schwalm.
	3	Derry,	1.5	8	P. R. R.,	8 75		Schwalm.
	11	Fairfield,	1.5	15	Sawmill,	1 20		Frain.
	14	Donegal,	.5	1	Log engine,			Knupp.
	14	Derry,	100	125	L. V. R. R. (?),	5 70	1 80	Munden.
	14-15	Derry,	300	1,500	Unknown,	19 50		Schwalm.
	16 18	Derry,	500	1,500	Unknown,	60 45		Schwalm.
	17-18	Ligonier-Derry,	125	125	L. V. R. R.,	11 75		Darr.
	18	Donegal,	35	500	Burning barn,	15 75		Kurtz.
	18	Derry,	35	200	Unknown,	10 05		Schwalm.
	18	Fairfield,	8	75	Sawmill,	24 75		Reed.
	19-20	Ligonier,	1,200	1,555	Log engine (?),	110 20	2 40	Wolford.
	20	Derry,	1		Boys (?),	1 20		Munden.
	20	Derry,	1	25	Unknown,	8 10		Schwalm.
Oct.	21	Fairfield,			Campers,	60		Frain.
	25	Donegal,	1		Unknown,	3 80		Roadman.
	28	Fairfield,			Unknown,	70		Frain.
Nov.	6	Donegal,	200	50	Hunters,	1 50	6 00	Roadman,

Detailed Statement of Forest Fires in 1917—Continued.

Date.		Township.	Acres.	Damage.	Cause.	Cost of Extinction.		Warden.
						Fire Fund.	Other Sources.	
	8	Derry,	50	100	Unknown,	3 00		Schwalm.
	10	Donegal,	30	35	Hunters,	6 30		Roadman.
	11	Donegal,	50	10	Hunters,	7 80		Roadman.
	15	Ligonier,	2		Hunters,	2 00		Wallace.
	17 18	Ligonier,		2	Hunters,	65		Darr.
			3,109.5	$6,983		$357 66	$87 95	
		WYOMING COUNTY.						
Mar.	30	Tunkhannock,	25	$50	L. V. R. R. (?),	$4 05		
April	4	Monroe,	40		Unknown,	5 40	$1 20	Welch.
	11	Meshoppen,	30	25	Burning stumps,	7 80	3 00	Atherholt.
	11	Falls,	25	75	Burning brush,	9 15	1 80	Craige.
	18	Clinton,	30	300	Burning brush,	2 50		Durland.
	21	Noxen,	50		L. V. R. R.,	15 45		Gardner.
	23	N. Branch,	35		Burning brush,		7 75	Turner.
	25	Tunkhannock,	30	75	Unknown,	6 60	3 00	Stevens.
	25 27	Forkston,	100		Burning brush,	33 90	1 50	Welch.
	28 29	Noxen,	200	50	L. V. R. R.,	11 35		Burgess.
	28 29	Nicholson,	100	15	Unknown,	8 45	2 25	Schenck.
	29	Noxen,	200	240	L. V. R. R.,	52 20	1 80	Brown.
May	2	N. Moreland,	8	190	Unknown,	18 00		Turner.
	11	Exeter,	5	50	Unknown,	5 80	50	Sickler.
	13	Noxen,	4	10	L. V. R. R.,	2 10		Durland.
	14	Monroe,	20	300	Burning brush,	8 19	1 05	Schenck.
	19	Clinton,	20		Burning brush,	2 50		Atherholt.
	20 27	Meshoppen,	30		Smoker (?),	17 85	1 50	Gardner.
	30 31	Forkston,	25		Burning brush,	5 10	45	Craige.
June	5 6	Forkston,	5		Unknown,	6 90	4 50	Harding.
								Burgess.
			982	$1,385		$223 29	$30 30	
		YORK COUNTY.						
Jan.	27	N. Codorus,	1		P. R. R.,	$2 25	$0 30	Fiestel.
April	14	Hopewell,	4		Stewartstown R. R.,			Storms.
	17	Dover,	7	$35	Burning brush (?),	12 60	1 65	Owens.
	22	Carroll,	6	50	Incendiary,	11 45		Weaver.

May	14	Fairview,	10		Burning brush,	2 85	2 25	Straley.
Nov.	8	L. Chanceford,	6		Unknown,	1 50	2 70	Sinclair.
	8-9	L. Chanceford,	20		Y. S. R. R.,	3 75	75	Sinclair.
	18	Franklin,	30	30	Unknown,	10 35		Sheaffer.
			84	$115		$44 75	$7 65	

"IT IS SAID THAT EVERY ACRE SHOULD BE MADE TO PRODUCE ITS HIGHEST REVENUE. WHAT'S THE USE, IF PRODUCTION IS SIMPLY TO BE BURNED?"

"CAN A BUSINESS MAN BE BLAMED FOR NOT IMPROVING HIS PROPERTY, WHEN IT IS CERTAIN THAT HIS PROPERTY WILL BE BURNED IN THE NEXT FIVE YEARS?"

"TAXES ARE PAID FOR PROTECTION. DO THE FORESTS GET THE PROTECTION THEY NEED? VISIT SOME OF OUR FOREST COUNTIES AND SEE FOR YOURSELF. WERE YOU THE CAUSE OF ANY OF THE FIRES? HAVE YOU DONE ANYTHING TO CHANGE PRESENT CONDITIONS?"

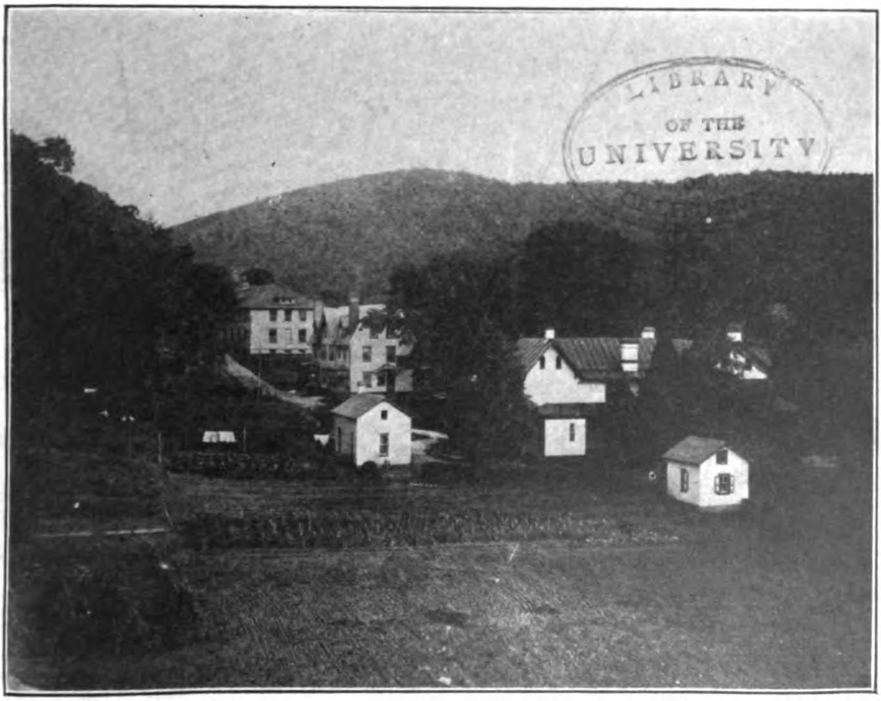
Bulletin #18

EXCHANGE
MAR 8 1920

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST ACADEMY

MONT ALTO, FRANKLIN COUNTY, PA.



LIBRARY OF THE UNIVERSITY

GENERAL VIEW OF BUILDINGS

FIFTEENTH ANNIVERSARY 1903-1918

HARRISBURG, PENNA.:
J. L. L. KUHN, PRINTER TO THE COMMONWEALTH
1918

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST ACADEMY

FIFTEENTH ANNIVERSARY 1903-1918

HARRISBURG, PENNA.:
J. L. L. KUHN, PRINTER TO THE COMMONWEALTH
1918

PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN,
Commissioner of Forestry
IRVIN C. WILLIAMS, ESQ.
Deputy Commissioner of Forestry

STATE FORESTRY RESERVATION COMMISSION

ROBERT S. CONKLIN, *President*
JOSEPH T. ROTHROCK, M. D.
WILLIAM P. STEVENSON
EDWARD BAILEY

FOREWORD.

The Pennsylvania Department of Forestry is undertaking the huge task of restoring the forests of the State to their original productive condition when they yielded abundant revenue to the owners, steady work for the laboring men, and healthful living conditions to all through their pure water supply, stream regulation, and prevention of erosion. To develop the one million acres of forest land purchased by the State, trained foresters were needed; and since no institution in the State could or would furnish them, the State Forest Academy was organized fifteen years ago.

The following fifteenth anniversary announcement is made to the people of Pennsylvania to inform them of the past progress and present standing of the school and to bespeak their hearty co-operation in the very urgent restoration of the forests of the State. It is not an extravagent claim to say that the health and prosperity of the entire State hinge on the success or failure of this movement.

Mont Alto, Pa.,
March 15, 1918.

THE FACULTY.

*Edwin Allen Ziegler, A. M.,
Director and Professor of Forestry.

Joseph Simon Illick, A. B.; B. F.; F. E.,
Acting Director and Professor of Forestry.

George Austin Retan, B. F.; Pd. M.,
Professor of Forestry.

Walter Boyd Evans, B. F.,
Professor of Forestry.

John Coleman Harris, A. M., M. S.,
Professor of Biology.

Eugene Peyton Deatrick, A. M.; Ph. D.
Professor of Soils and Chemistry.

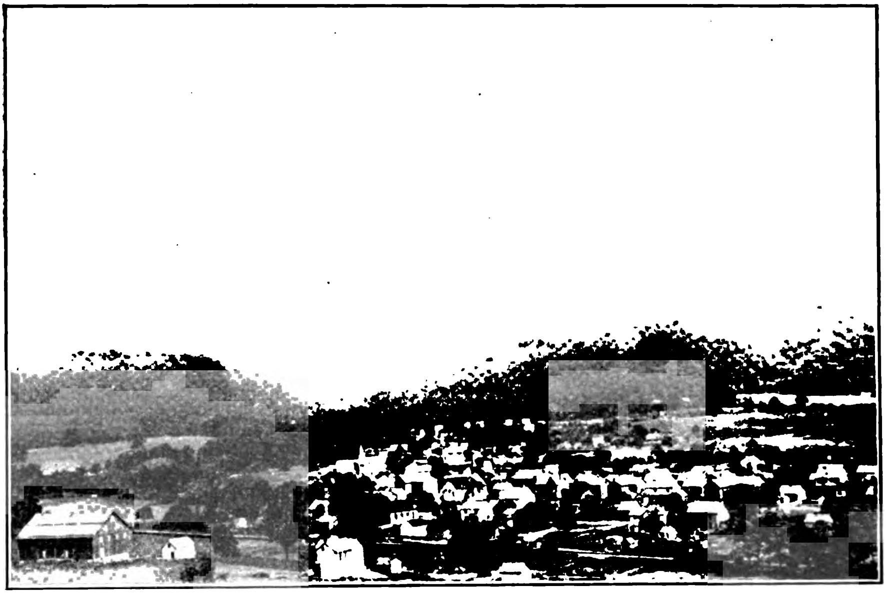
***Absent on leave for the period of the war.**

SPECIAL INSTRUCTION.

In addition to the regular courses of studies given by members of the faculty, special instruction is given by specialists in forestry and related professions. Subjoined is a list of some of the lecturers who have been scheduled for the 1917-1918 school year:

Dr. J. T. Rothrock, formerly Commissioner of Forestry and present member of Pennsylvania State Forestry Reservation Commission.
Hon. I. C. Williams, Deputy Commissioner of Forestry in Pennsylvania.
George H. Wirt, Chief Forest Fire Warden of Pennsylvania.
Lewis E. Staley, Forester, Mont Alto State Forest.
Prof. R. C. Hawley, Yale University Forest School.

A View on the Spacious and Attractive Campus Dotted with Many Native and Introduced Trees and Shrubs.



THE VILLAGE OF MONT ALTO.
Just Beyond the Town at the Western Foothills of the Picturesque South Mountains, and Within the Grove of Veteran Trees Standing at the Mouth of the Forested Gap, the Forest Academy is located.

A View in Mont Alto Park Conducive to Pleasant Walks and Interesting Out-of-Door Tree Talks.

Mira Lloyd Dock, Chairman Forestry Committee, General Federation of Women's Clubs.

S. T. Dana, United States Forest Service.

Hon. Charles Walter, Member of Pennsylvania House of Representatives.

Prof. Ralph Hosmer, Cornell University Forest School.

Raphael Zon, United States Forest Service.

ORIGIN AND EARLY HISTORY.

As early as 1876, in an address before the recently organized American Forestry Association at Philadelphia, Burnett Landreth pointed out the necessity of teaching Forestry as a science in itself and not as a branch of Agriculture. From that time, throughout the period of agitation and public education which preceded the foundation of the Department of Forestry there continued frequent references to the necessity of such a separate course or, better still, of a separate school devoted to the teaching of Forestry. Most of the ideas expressed were based on the European Forest Schools as models, but all recognized the necessity of adapting such a school to American needs and conditions. This agitation was especially strong in the years 1888 and 1889. During 1889 the trustees of the University of Pennsylvania established a chair of Forestry to be filled as soon as funds became available, but the chair was never filled.

Because of the slow growth of public sentiment in favor of Forestry, particularly among forest owners, no constructive steps were taken towards the establishment of a technical forestry course until about the year 1900. In issues of "Forest Leaves," in 1901 and 1902, are found several articles dwelling on the necessity of trained men to do forestry work upon the large areas of land which were rapidly passing into the control of the Department of Forestry. Dr. J. T. Rothrock, then Commissioner of Forestry, took the lead in this movement. Endeavors were made to have scientific courses added to the University of Pennsylvania or to Pennsylvania State College. These schools refused at that time to undertake the work. Appreciating the actual need of men and realizing the great advantages of a practical school connected with actual forest work, Dr. Rothrock decided to establish such a school under the control of the Department of Forestry and locate it upon a State forest. In the spring of 1902 the State Forester, Mr. George H. Wirt, a Biltmore graduate, was sent to Mont Alto to take charge of the property recently purchased from the Mont Alto Iron Company, and establish a forest nursery. Although the legislature of 1901 had refused to adopt Dr. Rothrock's plans, he felt sure that two years would find a change in sentiment, and, as a preliminary measure, four young men, Ralph E. Brock, Charles Delaney, Robert G. Conklin, and Harvey E. Frankenfield were sent to help Mr. Wirt and get some instruction in Forestry. In January, 1903, Paul E. Arnold, a German forester, and graduate of the famous Tharandt Forest Academy in Saxony, was added to the teaching force. By act of May 13, 1903, the school was formally established and plans were made for the entrance of the first class. The Forestry Reservation Commission had, however, previously adopted, on June 4, 1902, a curriculum and plan of work submitted by Mr. Wirt for the forest school then in his charge.

The original idea was that the students admitted should be composed of young men from the wooded districts with practical woods experience, and the first class was partly composed of such men. It was soon recognized that these men were often unable to do the mental work required in a study of scientific forestry and the entrance requirements were made strictly competitive with both physique and mental ability entering into the test. This plan has been constantly adhered to since that time.

At first there was some thought of moving the school to the Caledonia purchase as possessing better facilities, but this was finally given up and the administrative buildings of the old furnace at Mont Alto were utilized for the school. These were far from being ideal, and consequently the school was materially handicapped until in 1908, when ground was broken for the first of the present group of modern buildings.

LOCATION.

The Pennsylvania State Forest Academy is located about one mile from Mont Alto, a small village in Franklin County, which is sixty miles southwest of Harrisburg on the Cumberland Valley Railroad. The ground occupied by the school buildings is a part of the Mont Alto State Forest, which affords an opportunity for practical instruction and experimentation equalled by few, if any, American forestry schools. One of the foremost forestry educators of the United States called the Pennsylvania State Forest Academy, because of its excellent location, "the gem of American forest schools." The situation is healthful and the school is supplied with water from a spring located in the interior of the 23,000-acre forest. To the west of the school lies the Cumberland Valley which is regarded as one of the garden spots of Pennsylvania, and nearby are some of the most scientifically managed apple and peach orchards of the State.

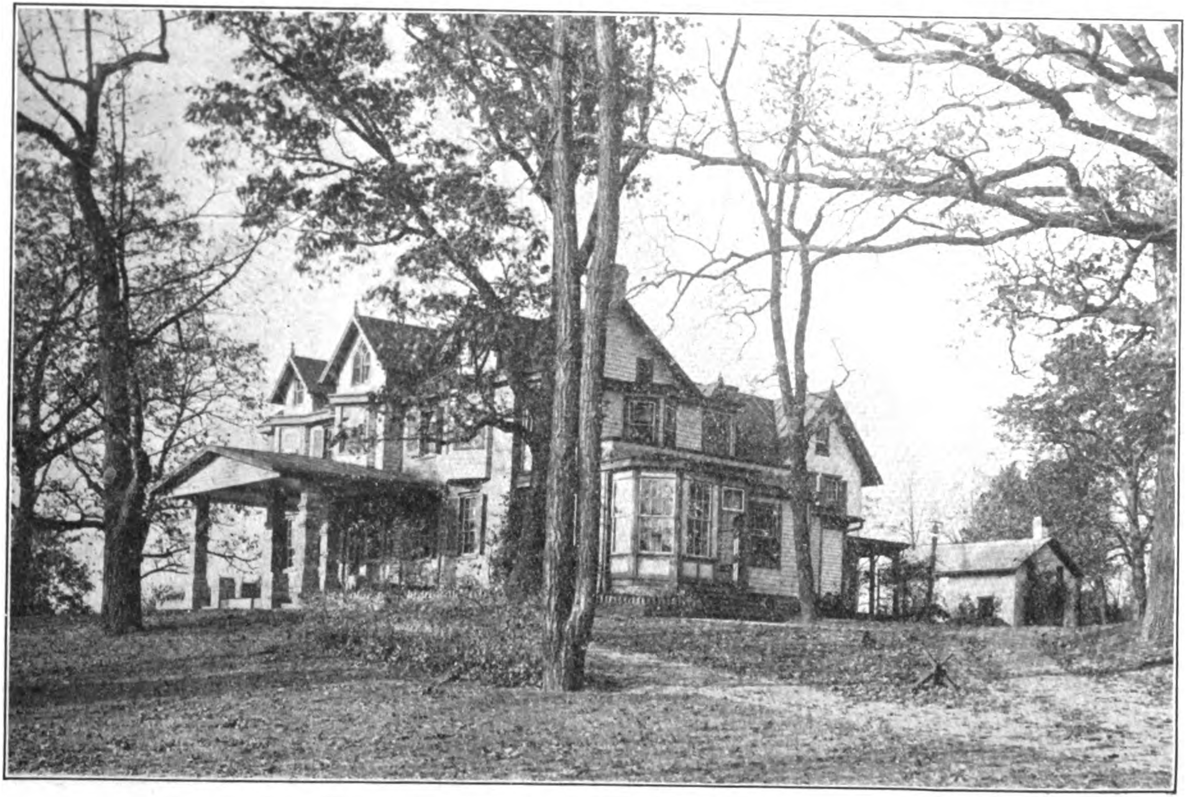
The remote location of the school stands in strong contrast with those in larger cities and college towns. Such an isolated situation has a few disadvantages, compensated fully however, by many advantages which make it not only attractive but also convenient for the study of the objects and phenomena of the forests. It enables the student to study things rather than about things.

BUILDINGS.

Thirteen buildings comprise the Academy group. Wiestling Hall, the oldest of the buildings, is a large three-story structure and was formerly the residence of Colonel George B. Wiestling, a member of the first Forestry Commission of Pennsylvania. This building has recently been remodeled and is now used as an administration building. It also contains the dining room, kitchen, and quarters for the matron and servants.

The Main Building was erected in 1908-1909 at a cost of $30,000. It is the largest building of the group and constructed of a very attractive native quartzite. On the second floor of this building are comfortable living rooms for all the students and two members of the faculty. The first floor is devoted to class rooms, laboratories, and the library. In the basement are a soils laboratory, a large wood specimen room, and a furnace room. The entire building is supplied with steam heat, illuminated with electricity, and furnished with necessary toilet rooms and lavatories.

A double cottage, occupied by the Director and another member of the faculty, was built in 1911. Three other single cottages are occupied by an instructor, the forester stationed upon the Mont Alto State Forest, and a clerk. Other buildings, such as spring house, ice house, gas house, poultry house, garage, wagon house, stable, and seed storage house, dot the environs of the campus, and are all necessary features of the school because of its isolated location.



WIESTLING HALL.
The Original Building of the Present Academy Group.

THE FACULTY COTTAGE.

THE LARGEST BUILDING OF THE ACADEMY GROUP CONSTRUCTED OF AN ATTRACTIVE NATIVE QUARTZITE STONE.

CAMPUS.

A spacious and attractive campus surrounds the school buildings. Upon it are many native and introduced woody plants. The most distinctive and impressive features of the campus are the massive Black Oak, White Oak, Rock Oak, and Chestnut trees which are remnants of the original forest and bear mute evidence of many struggles and successes during an existence of more than two centuries. Amidst these stately trees are carefully laid out drives and walks, and a wandering brook of pure mountain water. Overlooking all this picturesqueness is the productive and carefully managed Mont Alto State Forest.

FACILITIES FOR INSTRUCTION.

The facilities at Mont Alto for instruction in forestry compare favorably with any in America. The laboratory equipment is modern and complete and the object lessons in the school forest, nursery, and arboretum are easily accessible and cover a wide range of forestry problems. The proximity of the school to its out-door working field economizes much time which would otherwise be spent on the road.

The biological, chemical, and soil laboratories are adequately equipped with modern appliances and fully stocked with necessary working material.

Numerous collections have been prepared and are available for demonstrating lectures, laboratory work, and special investigations. A herbarium of more than 4,000 specimens of native and exotic woody and herbaceous plants is carefully classified and available for study purposes. A collection of forest tree fruits, seeds, and seedlings is in progress. Typical specimens of wood-destroying and parasitic tree fungi are on exhibition in a small museum. Many species of forest insects have been collected and specimens of their destructive work are available for study and demonstration purposes.

In the basement of the Main Building is a room 16x60 feet containing a collection of all the important commercial woods of the United States and some foreign woods. These woods are used in the course of Wood Identification. The room is equipped with wood-working tools and work benches.

A collection of tools, instruments, and machines used in lumbering, sylvicultural operations, protective work, and mensuration exercises is in progress. It contains planting hammers, fire torches, fire rakes, brush hooks and other implements designed by Pennsylvania and other American foresters. It also embraces representative European instruments.

The school is adequately equipped with the best and most practical instruments required in the practice of forestry. The surveying equipment discussed on page 36 is complete and up-to-date. The forest mensuration equipment comprises the best types of American and representative European calipers, hypsometers, increment borers, xylometers, chains, tapes, and other necessary instruments.

The library comprises all the standard texts on forestry in the English language and many publications in foreign tongues. All the principal forestry periodicals and representative lumber, trade, and technical journals are received regularly and filed systematically for future reference.

A large collection of carefully selected charts and photographs, covering all phases of forestal activities, is available for use and furnishes the best kind of illustrative material for class work. Lantern slides, covering the major forest operations and typical forest conditions, are in stock and are used to illustrate classwork.

For field work in forestry the vicinity of Mont Alto offers unsurpassed facilities. The latitude and topography favor a rich flora. It is the meeting ground of northern and southern species. The northern follow the mountains towards the South and the southern extend northward through the valleys. Within one mile of the school buildings occur more than 100 species of native woody plants and may introduced species. The richness of the local woody and herbaceous flora and its proximity to the school make it possible and practical to give the major part of the instruction in Tree Identification and Systematic Botany in the forest and nearby field without spending an excessive amount of time on the road.

A five-minutes walk from the school brings one to a forest nursery with an annual capacity of 2,000,000 seedlings. It is well equipped with modern nursery appliances, and in it the students learn, not by general observation but by actual work, nursery practice from the preparation and sowing of seed beds to the packing and shipping of seedlings and transplants.

The Mont Alto State Forest has been under careful and business-like management for the past seventeen years. It is dotted with plantations, experimental sample plots, improvement cuttings, fire towers, and ranger stations, ramified by roads and trails, covered with fire, compartment, and telephone lines, and partly divided into blocks, compartments, and stands. The plantations contain many different species of trees ranging in age from 1 to 17 years and cover an aggregate area of 499 acres. Improvement cuttings have been made annually since the creation of the forest. A study of the effect of light, medium, and heavy thinnings has been in progess for five years. One steel and two wooden towers have been erected at commanding lookout points. They and the ranger's houses are connected with the forester's headquarters by a state-owned metallic circuit telephone system, whose aggregate length is more than 26 miles.

The utilization operations are among the most interesting and instructive on the forest. Fuelwood, posts, and poles are harvested on a large scale. A state-owned portable sawmill, stave mill, shingle mill, and lath mill are operated on the forest. The students, as a part of their course in Lumbering, work upon these mills and learn to handle the different positions from felling the trees and firing the boiler to head sawyer and timber scaler. Briefly, the students are kept in constant contact with all the operations of a forest business, and taught the best and most efficient methods of handling a forest property both by precept and practice.

FACILITIES FOR RECREATION.

The faculty arranges annually a course of free lectures. These instructive and helpful talks are given to the students by men of prominence in subjects allied to forestry. They cover travel, history, civics, literature, first aid, wood craft, personal health, and other timely topics.

The student body maintains an athletic association. Athletic contests are not engaged in so extensively as at some other educational institutions because the students obtain sufficient physical exercise in their field work which takes them out of doors at frequent intervals during the entire year. A large baseball diamond, a double tennis court, a billiard table, and gymnastic equipment are available for use.

Basket Ball is the most popular game. It is especially adapted to a small student body and engaged in during the winter when field trips and forest exercises are few in number and of short duration. The schedule comprises games with normal schools and small colleges.

ALL-ABOARD FOR A FIELD TRIP

LUNCHEON IN THE WOODS.

PROMPT RESPONSE TO A FOREST FIRE CALL.

BASKET BALL TEAM

Hunting and fishing are among the most popular sports. The Mont Alto State Forest of 23,000 acres and adjoining forest properties and abandoned fields afford excellent and convenient hunting grounds. Within the forest is a game refuge of 2,000 acres in which wild animals and game birds are propagated systematically. Deer, opossums, raccoons, woodchucks, squirrels, rabbits, pheasants, and quail are plentiful, and wild turkeys and foxes are occasionally seen. It is not unusual to see a herd of fifteen deer, and occasionally a herd of 25 and in one instance 31 have been observed. During the 1915, 1916, and 1917 hunting seasons 59, 63, and 47 male deer respectively were shot on or near the Mont Alto State Forest. In spring time trout fishing offers an enjoyable form of recreation. The nearby mountain streams are numerous and well stocked.

Many points of historic interest are the objectives of week-end walking trips. Among these may be mentioned the Gettysburg and Antietam battlefields, President Buchanan's birthplace, and Pen Mar, a summer resort located on a high mountain at a point crossed by the Mason and Dixon line. Walks to local high points and commanding lookout towers are frequently scheduled. On the Mont Alto forest are one steel and two wooden towers 50 feet in height, affording excellent views of the extensive timbered mountain slopes and the fertile Cumberland valley, which is surpassed in Pennsylvania only by the Lancaster valley in its agricultural productive capacity.

PURPOSE.

The purpose of the Pennsylvania State Forest Academy is to prepare thoroughly trained foresters for the service of the State in its forests. The duties of a forester in the employ of the State require a thorough training and apprenticeship in actual woods work, besides the usual school studies in forestry, the sciences, and a number of cultural subjects. The forester must have an equipment covering the surveying and mapping of his forest; the growing of trees and their proper management from planting, through thinning, to final logging and sawing; the protection of the forest from its arch-enemy, the forest fire, as well as from insects, disease, and trespass; the building and improvement of the forest roads, trails, fire-lines, telephone lines, and fire towers; the estimate of timber and the calculation of its growth, value, and financial returns; the directing of labor; the keeping of records and accounts; and some knowledge of business and forest law. This requires an underlying training in mathematics, botany, zoology, chemistry, physics, geology, and soils, as well as history, language and economics.

The practical application of this training is the large feature of the school, for the entire course may be said to be given in the 23,000 acres of the Mont Alto State Forest in which the school is located. All the activities of the forester are followed in the woods from the growing of trees from seed in the nursery, to the grinding of the forest student's own axe, the cutting of undesirable trees into cordwood, and the mature trees into saw-logs, as well as their manufacture into lumber, lath, staves, and shingles on the school mills; from the day and night fighting of forest fires and the pick and shovel building of roads to the preparation of a thorough working plan for a specified tract of forest land.

But beyond all this technical training, the school aims to develop men who love the forest, for a successful forester must look upon the forest as more than a mere clump or collection of trees. He must see in it a complex community or society of living things and be on a speaking acquaintance with them all. He should know the wild animals, birds, plants, and rocks so well that he finds interest in them. A good forester should not be lonesome in the forest, but instead find continuous contentment in his extensive out-door laboratory.

Last, but not least, the school aims to graduate men who love the people of the forest, if not for what they are, at least for what he hopes they will become. A forester must be a man of parts with whom the people of the forest communities are glad to associate, willing to do ordinary business on a reliable basis, and discuss everyday problems with interest and benefit.

ADMINISTRATION.

The control of the school is vested by legislative enactment in the Commissioner of Forestry. The pedagogical supervision and immediate government is delegated to a director who resides at the institution and takes an active part in the instruction of the students.

DEGREE.

The degree of Bachelor of Forestry is conferred upon the successful completion of the prescribed courses of studies.

THE SCHOOL YEAR.

The school year is divided into first, second, and summer terms. The first term begins on the first Tuesday of September and extends to the middle of December, when the Christmas recess begins. The second term begins the first Tuesday in January and extends to the end of May. The summer term begins immediately upon the termination of the second term and extends to the middle of August when a two-weeks recess begins. The school year thus covers about forty-six weeks, and the entire course of three years represents 136 weeks of actual work, which is considerably more than is given in many four-year forestry courses.

THE FOREST CLUB.

The Rothrock Forest Club is a student organization named in honor of Dr. J. T. Rothrock, the founder of the school, and for many years the prudent leader and now the wise counsellor of the Pennsylvania Department of Forestry. The meetings are held in Log Lodge, a commodious log building finished in southern yellow pine and heated by a spacious fire place. The program of the meetings is similar to that of literary societies at other educational institutions. The club is also the agency through which the students are introduced to prominent men in forestry and other professions.

ENTRANCE REQUIREMENTS.

WHO MAY BE ADMITTED? Only citizens of Pennsylvania who are 18 years of age and under 25 on the first day of September, in the year in which the applicant is admitted.

THE PROSPECTIVE STUDENT must make application on a blank form to be furnished by the Commissioner of Forestry, Harrisburg, Pennsylvania.

METHOD OF ADMISSION. Admission can be gained only by examinations. No certificates are accepted. The first or preliminary examination consists of two parts, viz: a physical examination and a test in scholarship, and usually occupies two days. The physical examination is held the first day and if the applicant discloses satisfactory conditions, he is admitted the following day to the test in scholarship, which covers the following branches: English (Grammar, Composition, and Rhetoric), United States History, Civil Government, Arithmetic with special emphasis on Mensuration, Interest, Proportion, and Progression, Algebra (to and including pure and affected quadratic equations), Plane Geometry, and Biology (including Human Physiology).

As a result of the mental and physical examinations and the report of the examiners to the Commissioner of Forestry, the first fifteen men in the group of those examined will be assigned to Pennsylvania foresters on State Forests for practical work and instruction, during a period of two months, beginning about July first. At the end of this period the fifteen men so selected will assemble at a designated place where they will be subjected to a final examination which covers the probationary period spent on a State Forest. As a result of this test and the recommendation of the foresters in whose charge the applicants served, ten men of the group who pass the best examination in practical work will be nominated by the Commissioner of Forestry for admission to the Forest Academy the following September. Applicants will bear their own expenses while on a State Forest for the two-month period.

CONTRACT AND BOND: Each successful applicant receiving an appointment must enter into a contract with the Commonwealth of Pennsylvania for the proper fulfillment of his duties at the Forest Academy during the full course of three years, and then that he will enter the employ of the State after graduation, if his services shall be required. He must also furnish with his contract a bond in the sum of

$500 with sureties to be approved by the Commissioner of Forestry, conditioned that he will faithfully execute his contract. Sureties, if individuals, must be two in number, and show fee simple ownership of Pennsylvania real estate with an equity above all incumberances of at least the amount of the bond.

EXPENSE: The student will furnish his own clothing for out-door work, which should be plain, heavy, and strong, and such other clothing of a better character as he may desire to have. He will also bear his incidental expenses, which may be little or great, as he chooses, furnish his own soap and towels, procure such technical textbooks and instruments at his own expense as may be directed from time to time, and have available a sufficient sum of money to cover the expense of trips to neighboring State Forests, other nearby forested areas, and local wood-using industries.

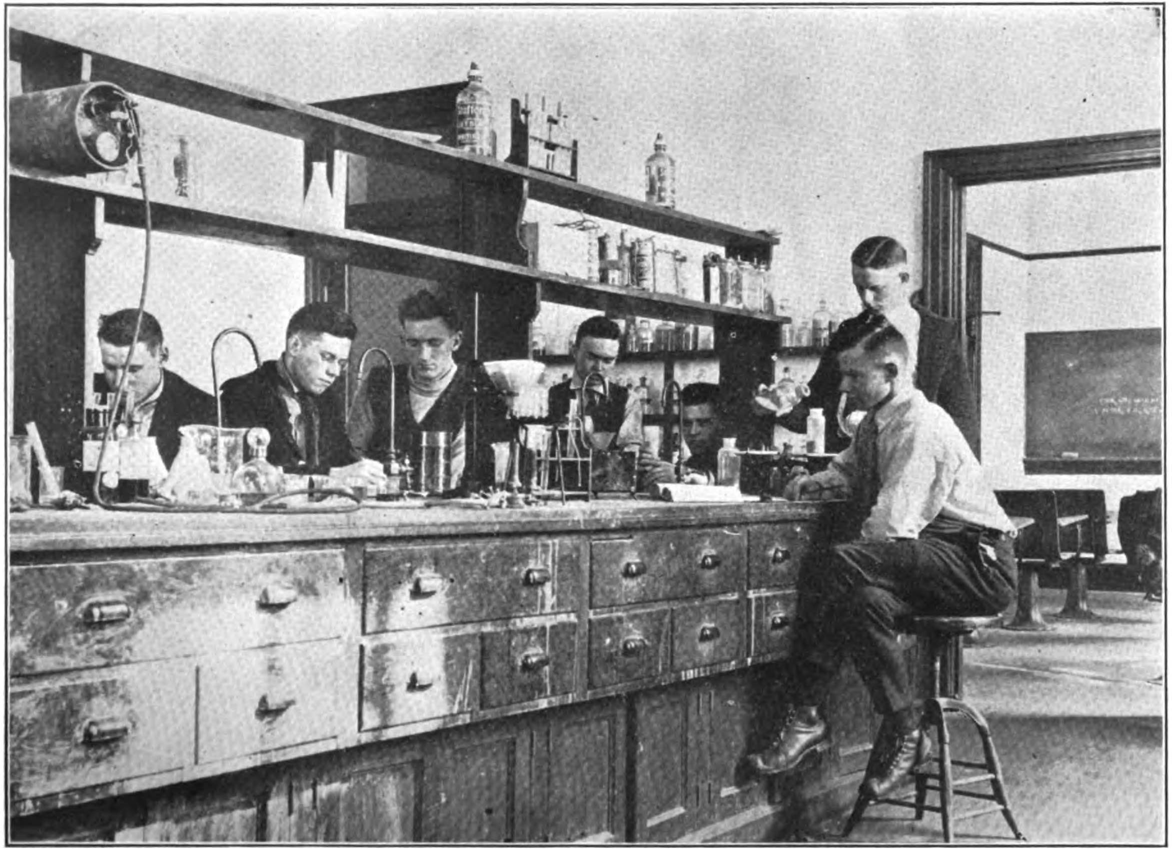
SERVICE AND SUPPLIES FURNISHED BY THE STATE: Each student will be furnished by the State, free of charge, his tuition, board, room, room outfit, bed clothes, stationery, and plain washing.

DEPOSIT: When a student enters the Academy he must make a deposit of $5.00 in money with the Director, against which will be charged all items of unnecessary, careless, or wilful breakage or damage to State property. Whenever a deposit is lowered by reason of charges against it, the student will be required to increase the deposit at the beginning of each school year to the full amount of $5.00. At the time of graduation there will be returned to him whatever balance may remain to his credit.

Counting and Bundling Seedlings in the School Forest Tree Nursery.

An Exercise in Forest Mensuration. Counting the Annual Rings on the Cross Section, and Determining the Contents of a Felled White Pine Tree.

A Real Test in Tree Identification Out in the Forest.



A LABORATORY EXERCISE IN SOILS.

ORDER OF STUDIES.

FIRST YEAR.

First Term.	Second Term
(1) English	(1) English
(2) German I	(2) German I
(7) General Physics	(8) Meteorology
(5) General Chemistry	(5) General Chemistry
(14) Botany I	(15) Botany II
(21) Beginner's Forestry	(43) Trigonometry

Summer Term—(42) Nursery Practicum, Improvement Cutting, (22) Forest Geography, (16) Botany III, and (23) Tree Identification.

SECOND YEAR.

First Term.	Second Term
(23) Tree Identification	(24) Dendrology
(26) Wood Identification	(30) Forest Mensuration
(25) Wood Morphology	(39) Silviculture I
(17) Botany IV	(18) Forest Pathology
(10) Geology	(20) Forest Entomology
(11) Introductory Soils	(12) Forest Soils and (13) Soil Surveying
(6) Forest Chemistry	(19) Zoology

Summer Term—(30) Forest Mensuration and (40) Sylviculture II.

THIRD YEAR.

First Term.	Second Term
(33) Forest Finance	(37) Forest History
(31) Forest Organization	(31) Forest Organization and (32) Working Plans
(41) Silviculture III	(34) Forest Administration
(38) Forest Protection	(35) Business Law
(27) Wood Utilization	(36) Forest Economics and Policy
(4) General Economics	(28) Forest Utilization and (29) Lumbering
(44) Surveying	(45) Roads
(3) German II	(44) Surveying
	(9) Forest Mechanics

Summer Term—(44) Surveying, and (45) Roads.

DESCRIPTION OF COURSES.

(1) ENGLISH. The course proposes to develop in the student an appreciation for good literature and to train him in adapting the best usages of the language to his own needs. It includes a review of English grammar and rhetoric, more or less intensive study of several of the best authors, and constant drill in analysis and composition; considerable attention is given to business forms and correspondence, public speaking, and writing for publication; extemporaneous speaking is a part of the regular class work. Throughout, the course insists upon clear thinking and direct, forceful expression. Lockwood and Emerson's ***Composition and Rhetoric*** is the text used. Three hours, first and second terms. Mr. Evans.

(2) GERMAN I. A course comprising a careful drill in pronunciation and in the principles of German grammar and syntax. Thomas' ***Practical German Grammar*** and such other texts as may be recommended. Three hours, first and second terms. Mr. Harris.

(3) GERMAN II. An elective course in German forestry literature of prominent authors. Hausrath's ***Der Deutsche Wald*** is the main text used. Three hours, second term. Mr. Illick.

(4) GENERAL ECONOMICS. A study of the principles of economics and their modern applications. Extended reference work among different authors is required, also the examination of current literature having to do with problems of an economic nature. Discussion of governmental questions and activities along economic lines is encouraged. Bullock's ***The Elements of Economics*** is the text used. Three hours, first term. Mr. Evans.

(5) GENERAL CHEMISTRY. A course comprising a short series of introductory lectures on the historical development of the science, and a general consideration of the occurrence, preparation, properties, reaction, and uses of the common elements. This is followed by a more thorough study of the properties and reaction of the common elements and acids, their detection in various liquid and solid mixtures, and the principles involved in the preparation and use of volumetric solutions and in the work of gravimetric analysis. Special emphasis is laid on carbon compounds in preparation for the course in Forest Chemistry. Smith's *General Chemistry* is the text used. Five hours, first and second terms. Mr. Deatrick.

(6) FOREST CHEMISTRY. The course consists of introductory lectures on the development of the subject of the nutrition and chemical composition of plants, followed by a consideration of the derived forest products, and destructive distillation, naval store, and wood preservation industries. The preparation of birch, wintergreen and pine needle oils. vegetable dyes, and other similar forest products, and their properties, reactions, and relations are fully treated. Four hours, first term. Mr. Deatrick.

(7) GENERAL PHYSICS. This course aims to give the student a working knowledge of the fundamental principles of physics by developing them from familiar facts and phenomena. The application of the commoner principles is demonstrated on trips to industrial plants, and illustrated with implements and machines used in forestry. The course aims primarily to prepare the student for the courses in Meteorology and Forest Mechanics. The laboratory exercises cover the proper-

ties of matter, heat, light (including elementary photography), sound, magnetism, and electricity. Four hours, first term. Mr. Deatrick.

(8) Meteorology. A general consideration of the phenomena of the atmosphere, their explanation and the forecasting of the weather. United States weather maps are received and studied from day to day. Two experiment stations are maintained, one in the forest and another in the open, where daily readings of maximum-minimum thermometers and rain gauge readings are made by the students. Practical field work and special lectures in forest influences are given in connection with this course. Milham's *Meteorology* is used as a text. Four hours, second term. Mr. Deatrick.

(9) FOREST MECHANICS. A study of the general principles of the construction, operation, and repair of machines, engines, boilers, telephone systems, fire towers, and appliances that a forester has occasion to use. Trips of inspection are taken to neighboring manufacturing and engineering plants, sawmills, and woodworking establishments. The students are given practical experience in the construction of telephone lines, cabins and fire towers, and in the setting up and operation of portable sawmills. One hour lecture and twenty-five hours of field work, second term. Mr. Deatrick.

(10) GEOLOGY. The object of this course is to furnish a fundamental knowledge of geologic principles and to prepare the students for work in soil technology. An elementary review of the geological history of the earth, with special attention to structural and dynamic geology is followed by a detailed study of rock weathering and the classification of physiographic and soil provinces. The laboratory exercises are designed to teach recog-

nition of the common soil-forming rocks and minerals; their composition and mode of origin; and decomposition products. Field excursions, and the study of topographic maps emphasize the influence of the forces of weathering on the formation of the various soils. Tarr's *Elementary Geology* is the text used. Four hours, first term. Mr. Deatrick.

(11) INTRODUCTORY SOILS. A course including the study of (1) the classification of soils; (2) mechanical and chemical analyses; (3) physical, chemical, and physical-chemical properties; (4) moisture and its control; (5) soil biology; (6) the management of soils for increased production. The laboratory work is designed to demonstrate fundamental physical relations with special emphasis on the collodial nature of organic soils. Lyon, Fippin, and Buckman's *Soils: Their Principles and Properties* is the text used. One hour recitation and three hours laboratory, first term. Mr. Deatrick.

(12) FOREST SOILS. An advanced course in which the chemical, physical, and biological phases of the organic matter in the different forest soils are considered from the point of view of economic factors of forest production. The laboratory work consists of an examination of the microbiological flora of forest soils and experiments to demonstrate (1) the rôle of microorganisms in soil fertility, (2) the decomposition of organic matter, and (3) the metabolism of the carbon, nitrogen, and sulphur cycles. The field work is designed to show the effect of the soil factors on the choice of tree species in artificial regeneration and to classify the different forest soils on the basis of the existing vegetation. The outline of the course follows Rauman's *Bodenkunde*. Three hours, first part of second term. Mr. Deatrick.

(13) SOIL SURVEYING. The course is designed to give a working knowledge of the methods employed in the preparation of reconnoisance and detailed soil surveys of forest areas and to acquaint the students with the fundamentals of site qualities as used in forest organization. Field exercises in plane tabling, the determination of soil types and their mapping on prepared or topographic maps are distinct features of the course. A specified part of a State Forest is mapped each year. Two entire weeks, latter part of second term. Mr. Deatrick.

(14) BOTANY I. (THE STRUCTURE AND FUNCTIONS OF PLANTS). A course specially adapted to the early and fundamental training of a forester. It comprises a study of the external and internal morphology of the seed-bearing plants with special reference to the fruit, and the root, stem, and leaf systems. This is followed by a discussion of the life processes of plants, such as absorption, conduction, transpiration, and photosynthesis. Part I of Ganong's *A Textbook of Botany for Colleges* is the text used. Two hours lectures and three hours laboratory, first term. Mr. Harris.

(15) BOTANY II. EVOLUTION OF THE PLANT KINGDOM. A careful study of representative examples among the algae, fungi, liverworts, mosses, ferns and their allies, gymnosperms, and angiosperms, with special emphasis on the form of plant parts, and a comparison of them in the different groups. Special attention is also given to the alternation of generations in the plants studied, and in working out their life histories, the progression and retrogression of certain organs and phases in proceeding from the lower to the higher plants are noted. Part II of Ganong's *A Text-*

book of Botany for Colleges is the text used. Two hours lectures and three hours laboratory, second term. Mr. Harris.

(16) BOTANY III. TAXONOMY. A comparative study is made of the families of flowering plants, and special training is given in the methods of collection and preservation of material. Each student is required to identify and make an herbarium of at least 150 species of herbaceous plants. Gray's *New Manual of Botany* and Britton and Brown's *Illustrated Flora of the Northern States and Canada* are the text and reference used. One hour lecture, and ten hours laboratory or field work during April, May, and June. Mr. Harris.

(17) BOTANY IV. PLANT ECOLOGY. The course deals with the relation of plants to their environment. First, there is a study of the ecological factors, which in general are grouped under physical, climatic and biotic factors. This is followed by a discussion of succession, the struggle for existence among plants, the laws of migration, the analysis of vegetative forms and structures, plant formations and societies.

In the laboratory different members of the plant are studied as to their special functions and their relation to environment. The stem, root, leaf, flower, etc., are carefully examined and their ecological relations pointed out.

The Forest Academy is very favorably located for the field study of Plant Ecology, as a great variety of plant life conditions may be found in the immediate vicinity of the school. Therefore, students are able to work in the adjoining fields and forests, which is a decided advantage over the studying of plant life processes in the laboratory. Two hours lectures, and three hours field work or laboratory, first term. Mr. Harris.

(18) FOREST PATHOLOGY. A course considering representative tree diseases caused by Cryptogamic parasites and saprophytes, and parasitic flowering plants. Preventive and remedial measures for checking their damage are discussed. Class and laboratory work are supplemented by field exercises. Three hours, second term. Mr. Harris.

(19) ZOOLOGY. In this course a general survey is made of the animal kingdom from the Protozoa to the Vertebrata. The classification and distribution of animals both in regard to time and space, the structure and development of cells, tissues, and organs, regeneration, effects of environmental factors as determining form, organic evolution, and heredity are studied. The lectures are well illustrated by over 100 invertebrates carefully identified and preserved, by several hundred slides showing the various kinds of cells, tissues and organs as well as their development. In the laboratory each student dissects an animal typical of each phylum and makes drawings of parts observed. Two hours lectures and three hours laboratory or field work, second term. Mr. Harris.

(20) FOREST ENTOMOLOGY. A general discussion of the morphology, physiology, development, and classification of insects; the life history of both beneficial and injurious species, with special reference to those forms which are of economic importance in the forest. Two hours, second term. Mr. Harris.

(21) BEGINNER'S FORESTRY. A course aiming to lay a broad foundation for the later and more specific courses in forestry. Special emphasis is laid upon field work in the State Forest of 23,000 acres adjoining the school, which is generally regarded as the best developed and

OPERATING A TRANSIT DURING AN EXERCISE IN FOREST SURVEYING.

IN THE BOTANICAL LABORATORY.

ESTIMATING TIMBER

MEASURING THE HEIGHT OF TREES WITH DIFFERENT HEIGHT MEASURING INSTRUMENTS.

most instructive in Pennsylvania. Upon it are many plantations, improvement cuttings, sample plots, fire towers, telephone and compartment lines, established within recent years. Each student is required to prepare a written report of every field trip, which report is corrected and returned. Moon and Brown's ***Elements of Forestry*** is used as a text. Four hours, first term. Mr. Retan.

(22) FOREST GEOGRAPHY. The course aims to give a survey of the Forest Regions of the world. It comprises lectures on the ecological and economical features of tropical and sub-tropical forests; a brief description of temperate forest regions; a detailed study of the forest regions and types of the United States. Two hours, summer term. Mr. Retan.

(23) TREE IDENTIFICATION. A field course embracing the study of the woody vegetation in the vicinity of Mont Alto, where more than 150 species of native trees and shrubs are found. The woody flora about Mont Alto embraces northern species which follow the mountains towards the south and southern species which extend northward through the Cumberland valley. More than 100 different species of native woody plants are found within 15 minutes walk of the school. Many introduced species are accessible for study in the plantations of the Mont Alto State Forest, and in the school nursery and arboretum.

This course consists almost entirely of field work. An afternoon of each week is spent in nearby forests and fields, and at irregular intervals a day or a week-end trip is taken to nearby points of special dendrological interest, such as the Gettysburg battlefield and the banks of the Potomac river. Field tests cover about 700 specimens annually, representing almost 200 different species. A collection of winter twigs mounted on cards, and keys based on winter and summer characteristics are required. Illick's ***Check-list of Woody Plants near Mont Alto*** and Illick's ***Pennsylvania Trees*** are used as texts. Seven hours during latter part of summer term, and 4 hours first term. Mr. Illick.

(24) DENDROLOGY. A general systematic and biological study of the forest trees of the United States and the commoner introduced species, with special reference to important timber trees. Particular attention is given to their distinguishing characteristics, occurrence, and geographical distribution. Three hours, second term. Mr. Illick.

(25) WOOD MORPHOLOGY. A study of the microscopic structural features of wood. Representative type specimens of the conifers and broad-leaved trees are studied in detail with compound microscopes in order to determine the occurrence, form, and structure of the wood elements. All structural features, which are of value in distinguishing the different woods, are studied under the simple and compound microscopes from cross, radial, and tangential sections of the different woods. Record's ***Identification of the Economic Woods of the United States*** and Jeffrey's ***The Anatomy of Woody Plants*** are used as texts and references. Three hours, first term. Mr. Harris.

(26) WOOD IDENTIFICATION. A practical workroom course in the visual identification of the important commercial woods of the United States. It considers primarily the macroscopic features of woods and supplements the course of ***Wood Morphology*** which covers the microscopic characteristics. A workroom 16x60 feet

supplied with work-benches and tools and containing a collection of all the important American and many foreign woods affords the student an excellent means of acquainting himself with the common woods of the market. Weekly tests are held in the work room, and occasionally wood specimens are included in the field tests of the companion course of Tree Identification. Three hours, first term. Mr. Illick.

(27) WOOD UTILIZATION. This course considers the uses of wood, their physical properties, and the most important wood-using industries. It aims to point out the interrelation between the distinctive properties and price of each wood, to show the adaptability of certain woods to specific uses, and indicate how the wood of inferior species may be used advantageously. *Wood-using Industries of Pennsylvania* and other states, and Record's *Mechanical Properties of Wood* are used as references and texts. Two hours, first term. Mr. Evans.

(28) FOREST UTILIZATION. This course aims primarily to lay a foundation in the principles of lumbering by acquainting the students with past, present, and future methods of logging in the United States and in foreign countries. Special emphasis is given to methods of lumbering now applicable to the forests of the State of Pennsylvania. Nearby lumbering operations are studied and reported. The course also considers the harvesting of such accessory forest products as clay, sand, bluestone, ganister rock; and such minor forest products as leaf litter, leaf fodder, and tree fruits for human, animal, industrial, and nursery uses. Four hours, second term. Mr. Evans.

(29) LUMBERING. A practical course in logging and lumber manufacture. Each student works at all positions

from the marking and felling of trees through the sawmill operations to the stacking of the finished material in the yard. A school sawmill, shingle mill, stave mill, and lath mill afford an excellent and continuous opportunity for practical experience. A comparative study of log rules, the scaling of logs, the determination of the contents of logs, and the ascertaining of mill factors are special features of this course. Two to three entire weeks, second term. Messrs. Staley and Evans.

(30) FOREST MENSURATION. A course of lectures, recitations, field work, and office work in commercial and scientific methods of measuring the contents of stands, standing and felled trees, and parts of single trees. The principles of timber estimating, log scaling, and lumber inspection are considered. Growth studies and tree analyses are special features of the course. Volume, form-factor, and yield tables are constructed.

Special exercises have been prepared for the field work covering chaining, calipering, height growth, volume growth, estimating height, diameter and volume, and determining the volume of stands. A school sawmill, shingle-mill, stave mill, and lath mill are available and permit the working out of many practical problems, particularly mill and waste factors. A practical xylometer is used in the accurate determination of volume. Graves' ***Forest Mensuration*** is used as a reference text; outlines or field problems are supplied. Two hours, second term, and practically the full time of the summer term. Mr. Illick.

(31) FOREST ORGANIZATION. A course aiming to direct the activities of a forest in such a manner that the products derived therefrom will be used in a profitable way and removed in accordance with a prescribed fell-

ing budget contemplating a continuous yield management. Consideration is given to the fundamental principles underlying the subject, the increment of stands, yield tables, forest capital, maturity and rotation, normal forest, and the determination of the felling budget.

Upon the completion of the theoretical part of the subject the applied part is taken up, which consists almost entirely of field work and the compilation of field data. Each class is required to make geometric, quantitative, and qualitative surveys of a specified forest area which form the basis of a working plan. A portion of a State Forest is annually divided into compartments and the stands thereon are differentiated on the basis of age, species, density, site-quality, and sylvicultural system. The preparation of stand and age-class maps are also features of the course. Roth's *Forest Regulation* and Recknagel's *Theory and Practice of Working Plans* are used as texts and references. Three hours first term, and four hours first part of second term. Mr. Illick.

(32) FOREST WORKING PLANS. This course, immediately follows Forest Organization, and is designed especially to give practical training in the preparation of concise reports containing prescribed instruction for the conduct of operations on a forest property. Each student is required to prepare a report for a specified forest area. Three lecture and recitation hours latter half of second term and sixty hours of field work. Mr. Illick.

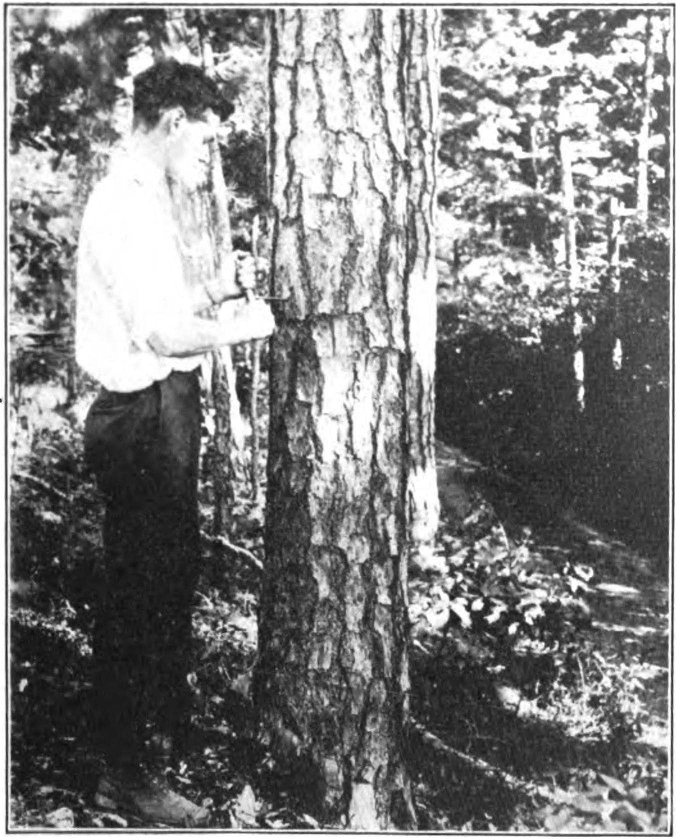
(33) FOREST FINANCE. The course includes Forest Valuation and Forest Statics. The work in Forest Valuation is prefaced by a careful review of fundamental interest formulae. The valuation of the producing factors,

Cost Value, and Expectation Value, are considered. Especial emphasis is laid on the determination of damages and the factors influencing the future value of forest products. In Forest Statics the differentiation of absolute forest land from agricultural and grazing land is stressed. Special lectures are given on the Soil Rent and Forest Rent theories. A considerable portion of the courses is devoted to typical American forestry and lumbering problems. Roth's *Forest Valuation* is the text used. Three hours, first term. Mr. Retan.

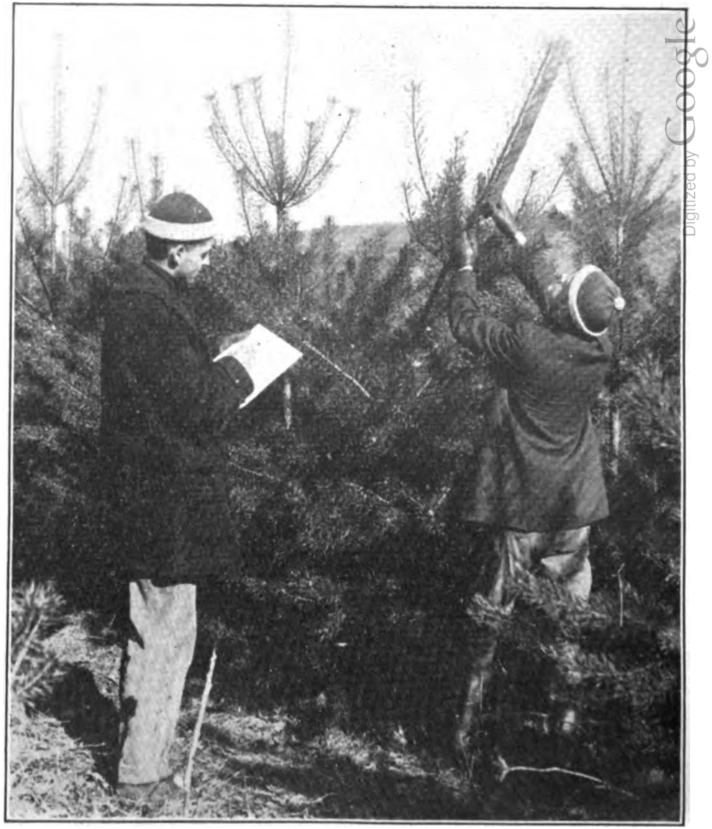
(34) FOREST ADMINISTRATION. This course is designed to cover the principles and methods employed in the administration of forest properties. The organization of the personnel and the methods of conducting the forest business in different countries and states is discussed. Special emphasis is given to the administrative problems pertaining to the State forests of Pennsylvania. A study of the special forms used by the Pennsylvania Department of Forestry in the conduct of its business comprises a significant part of the course. One hour, second term. Mr. Illick.

(35) BUSINESS LAW. An elementary course in the principles of law as met with in the business of forestry. Huffcut's *The Elements of Business Law* is the text used. Kinney's *Essentials of American Timber Law* is used for cases and readings. Three hours, second term. Mr. Retan.

(36) FOREST ECONOMICS AND POLICY. A course of lectures treating the forest problem from a economic point of view, and the principles of a rational forest policy. It aims to show the needs and results of forestry, and discusses the functions of the National Government, the State, Counties, Municipalities, and Com-

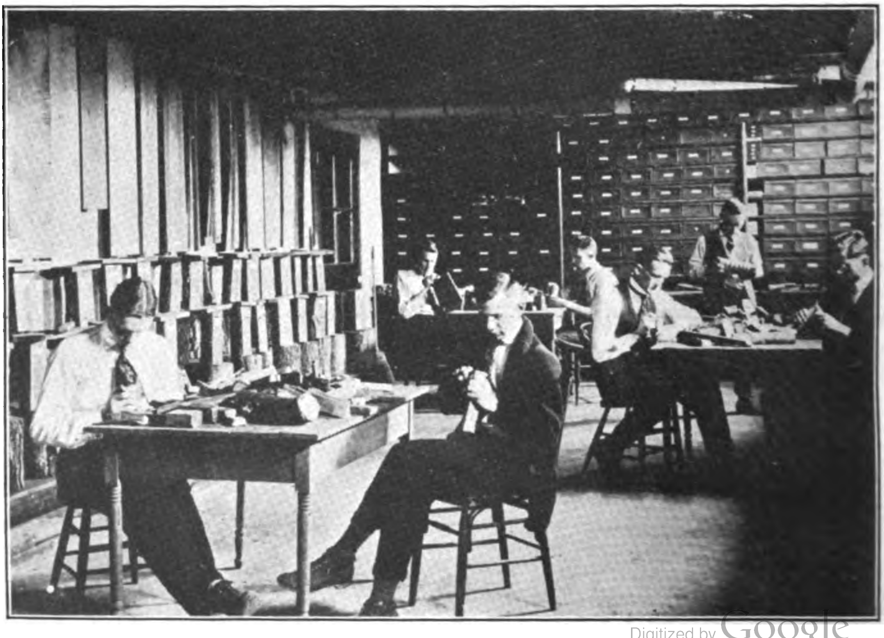


Using an Increment Borer to Determine the Age of a Tree.



Measuring the Height Growth of Young Scotch Pine Trees.

STUDENTS MAKING A STUDY OF THE CHESTNUT SHINGLE BUSINESS.



A TEST IN WOOD IDENTIFICATION.

munities relative to forestry. Fernow's ***Economics of Forestry*** is used as a reference. Three hours, second term. Mr. Retan.

(37) FOREST HISTORY. A course giving the development of the forestry idea in foreign countries and in the United States, particularly Pennsylvania. It considers the forest conditions and laws in colonial times, the early botanists, the primaeval forest of the State, the beginning and development of lumbering, the "Fathers of Pennsylvania Forestry," the history of the State Forest Academy, and the achievements of its alumni. Fernow's ***History of Forestry*** is the text used, supplemented by lectures and readings in Kinney's ***Development of American Forest Law***. Two hours, second term. Mr. Retan.

(38) FOREST PROTECTION. A detailed discussion of the grazing and the fire problems, particularly adapted to the conditions prevailing in the Pennsylvania forests. A complete fire protective system is planned and worked out for a specified forest area. Effective methods of preventing and controlling forest fires and the use of practical firefighting tools are emphasized. Forest fire laws and protective measures of other states and countries are considered. Public education is discussed.

The field work consists in part of trips to various parts of the Mont Alto and neighboring State Forests for the study of the existing protective systems and the effect of grazing, frost, heat, erosion, and other destructive agents. The entire student body participates actively in the extinguishing of all fires which occur upon the Mont Alto State Forest and adjoining forest properties. This affords the best possible training in the most important phase of present-day forestry. A two-ton Bessemer truck, fully equipped with fire-fighting tools, is continuously kept in readiness to transport the students to the fires. A special forest fire wagon and a number of saddle horses are also available for use. Three hours, first term, Mr. Retan.

(39) SILVICULTURE I. FOREST ECOLOGY. A course discussing the effect of the atmosphere, heat, light, wind, and soils, on tree growth and distribution; effect of the forest on the soil and climate; forest types, their description and distribution; the internal struggle of the stand; stand description. Schlich's *Silviculture* and Mayr's *Waldbau* are the references used. Three hours lectures and three hours field work, second term. Mr. Retan.

(40) SILVICULTURE II. SEEDING AND PLANTING. Seed production and collection. Nursery work and administration. Direct seeding and planting. In addition to the regular field work of this course, directed towards the study of reforestation problems, the class performs all the different operations in the Mont Alto nursery, which has a capacity of 2,000,000 seedlings per year and affords an opportunity of familiarizing the students with all nursery problems. The students also take an active part in planting on the different State Forests during each of the three school years. Toumey's *Seeding and Planting* is the text used. Two hours lectures and three hours field work, summer term. Mr. Retan.

(41) SILVICULTURE III. REGENERATION SYSTEMS. A critical study of pure and mixed woods; high and low forests; natural seeding systems; coppice wood management; the woodlot; cleanings, thinnings, and im-

provement work. Each year the students make a number of experimental cleanings and thinnings. A large number made in previous years is now yielding unexcelled material for instructional work. Graves' *Principles of Handling Woodlands*. Schlich's *Silviculture,* and Mayr's *Waldbau* are used as references. Two hours lectures and two hours field work, first term. Mr. Retan.

(42) NURSERY PRACTICUM. Each year considerable time is spent by the students in the nearby forest tree nursery with a bed area of over three acres. Considerable practice is obtained in each operation from spading the beds to shipping the trees. Costs are calculated for all work done, and nursery forms and accounting methods explained. Problems in nursery management and supervision are discussed in detail. The students also participate in experimental work which is constantly in progress, and members of the Senior class are given experience in directing work. Specially designated days, summer term. Mr. Retan.

(43) TRIGONOMETRY. The course covers trigonometric analysis, right and oblique triangles, and the use of logarithms and trigonometric tables in the solution of problems. Phillips and Strong's *Elements of Trigonometry* is the text used. Three hours, second term. Mr. Evans.

(44) SURVEYING — PLANE AND TOPOGRAPHIC; MAPPING. A course including compass and transit surveying; levelling with spirit level and barometer; plane-table and traverse-table work; stadia measurements; triangulation; practice in land surveying, particularly in tracing and re-running old lines; laws and customs applying to land surveying; care, testing, and

adjusting of instruments. Tracy's ***Plane Surveying*** is the text used. The equipment consists of Young engineer's transit; Gurley Engineer's transit with gradienter; two Randolph Mountain transits; plane-table, telescopic alidade with stadia; two traverse boards; two Wye levels, one 16 inch and one 18 inch; open sight compasses; barograph and aneroid barometers; standardized steel tape with spring balance attachment; tapes, chains, level rods, and all necessary drafting equipment, including polar planimeter, pantographs, and blue-printing outfits. Two hours recitation, five hours field work, and drafting, first and second terms, followed by 10 weeks of topographic surveying and mapping. Mr. Evans.

(45) ROADS. A course of lectures and references covering the history and development of road building; traction principles and grades; drainage; purpose and location of forest roads with particular reference to Pennsylvania conditions; construction and cost of surfaced and dirt roads. The field work consists of location surveys of mountain road; grading and draining; examination of modern surfaced and dirt roads in mountain districts. Two hours, second term. Mr. Evans.

A LESSON IN SAW-FILING.

STUDYING THE OUTPUT OF A PORTABLE SAWMILL.

GRADUATES.

Name	Class	Address.
Avery, John E.,	1906	Notch, Pike Co., Pa.
Baer, Charles E.,	1915	Elimsport, Lycoming Co., Pa.
*Barnes, Leonard G.,	1914	Pleasant Gap, Centre Co., Pa.
Bartschat, Walter J.,	1914	Troxelville, Snyder Co., Pa.
Bastian, John A.,	1909	Mount Union, Huntingdon Co., Pa.
Bearer, Valentine M.,	1913	Ligonier, Westmoreland Co., Pa.
Bietsch, Tom O.,	1908	McAlveysfort, Huntingdon Co., Pa.
*Blouse, Joseph R.,	1916	Wrightsville, York Co., Pa.
Bodine, Alfred W.,	1910	Mt. Union, Huntingdon Co., Pa.
*Breneman, Howard E.,	1917	Hollidaysburg, Blair Co., Pa.
Brock, Ralph E.,	1906	3857 Carnegie Ave., Cleveland, Ohio.
Bryner, Harold E.,	1908	New Germantown, Perry Co., Pa.
*Buch, J. Edward,	1917	Lititz, Lancaster Co., Pa.
Byers, William L.,	1906	Rainsburg, Bedford Co., Pa.
Conklin, Robert G.,	1906	Fayetteville, R. D. No. 2, Franklin Co., Pa.
*Conklin, W. Gardiner,	1908	Department of Forestry, Harrisburg, Pa.
*Critchley, Horace F.,	1913	North Bend, Clinton Co., Pa.
Dague, William F.,	1908	Clearfield, Clearfield Co., Pa.
Detz, Lewis M.,	1916	Coburn, Centre Co., Pa.
Dutlinger, Forrest H.,	1908	125 9th St., Renovo, Clinton Co., Pa.
Elder, John R.,	1913	Deceased.
Elliott, Harry E.,	1909	Sizerville, Cameron Co., Pa.
Emerick, R. Lynn,	1909	Coudersport, Potter Co., Pa.
Evans, Horace C.,	1908	Lafayette Hill, Montgomery Co., Pa.
Evans, W. Boyd,	1912	Mont Alto, Franklin Co., Pa.
Fawley, J. Russell,	1914	Wissahickon, Philadelphia, Pa.
Fox, P. Hartman,	1911	Austin, Potter Co., Pa.
Funk, Nathaniel B.,	1912	Waynesboro, Franklin Co., Pa.
Golden, Thomas H.,	1913	Syracuse, N. Y.
Harbeson, Thomas C.,	1914	Lloyd, Tioga Co., Pa.
*Harlacher, Josef B.,	1917	East Berlin, Adams Co., Pa.
Heintzleman, B. Frank,	1907	U. S. Forest Service, Eugene, Lane Co., Oregon.

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*In Military Service, U. S. Army.

GRADUATES—Continued.

Name	Class	Address.
Hogeland, Charles C.,	1916	Department of Forestry, Harrisburg, Pa.
*Hogentogler, Joseph R.	1912	Loganton, Clinton Co., Pa.
*Horning, W. Harold,	1914	Karthaus, Clearfield Co., Pa.
*Houpt, W. Elmer,	1909	Aitch, Huntingdon Co., Pa.
*Houtz, Jesse M.,	1913	Orwigsburg, Schuylkill Co., Pa.
*Irvin, James A.,	1912	Altoona, Pa.
Jerald, Frank D.,	1910	Deceased.
Keller, John W.,	1910	Boalsburg, Centre Co., Pa.
Kirk, Carl L.,	1909	Penfield, Clearfield Co., Pa.
Kraft, William H.,	1906	Deceased.
*Leach, Walter,	1914	Department of Forestry, Harrisburg, Pa.
Ludwig, Walter D.,	1910	Johnstown, Cambria Co., Pa.
MacAvoy, John L.,	1911	Care of Lehigh-Portland Cement Co., Albany, N. Y.
McCool, B. B.,	1913	203 E. 47th St., Portland, Oregon.
McNaughton, Nelson R.,	1911	Department of Forestry, Harrisburg, Pa.
*McNeal, James E.,	1907	Reading, Pa.
*McNulty, Leighton E.,	1917	Chambersburg, Franklin Co., Pa.
*McPherson, Benj. D.,	1916	Department of Forestry, Harrisburg, Pa.
*Meek, Charles R.,	1912	Coburn, Centre Co., Pa.
Metzger, Homer S.,	1909	Loganton, Clinton Co., Pa.
*Middour, J. Calvin,	1916	Fayetteville, R. D. No. 2, Franklin Co., Pa.
*Miller, Edwin B.,	1917	Chambersburg, Franklin Co., Pa.
Miner, Clement C.,	1910	Venango, Crawford County, Pa.
*Montgomery, W. Erdmann,	1913	Mont Alto, Franklin Co., Pa.
Morgan, Howard H.,	1915	Slate Run, Lycoming Co., Pa.
*Morton, J. Newton,	1916	Department of Forestry, Harrisburg, Pa.
Morton, T. Roy,	1908	Petersburg, Huntingdon Co., Pa.

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*In Military Service, U. S. Army.

GRADUATES—Continued.

Name	Class	Address.
*Moyer, Marvin H.,	1916	Telford, Montgomery Co., Pa.
Mueller, Harry J.,	1909	Buffalo, N. Y.
Mulford, Paul H.,	1907	Asaph, Tioga Co., Pa.
Muller, Max E.,	1913	Hammersleyfork, Clinton Co., Pa.
Mumma, Walter M.,	1911	Steelton, Dauphin Co., Pa.
*Musser, Ralph W.,	1917	Altoona, Pa.
Mustin, Maurice,	1912	915 S. 50th St., Philadelphia, Pa.
Neefe, Robert R.,	1913	Waterville, Lycoming Co., Pa.
Perry, George S.,	1913	Aitch, Huntingdon Co., Pa.
*Port, Harold F.,	1916	Asaph, Tioga Co., Pa.
*Powers, James E.,	1915	Pine Grove Furnace, Cumberland Co., Pa.
Retan, George A.,	1909	Mont Alto, Franklin Co., Pa.
*Robinson, Milton O.,	1912	Orland, Glenn Co., California.
*Root, Lloyd D.,	1917	Beccaria, Clearfield Co., Pa.
*Rowland, Horace B., Jr.,	1915	Department of Forestry, Harrisburg, Pa.
Rupp, Alfred E.,	1909	Fort Loudon, Franklin Co., Pa.
Ryon, James B.,	1912	East Orange, New Jersey.
*Seltzer, John W.,	1909	Franklin Furnace, N. J.
*Sheeler, George W.,	1912	Snow Shoe, Center Co., Pa.
*Shenefelt, Ira L.,	1916	Department of Forestry, Harrisburg, Pa.
*Siggins, Howard W.,	1914	Department of Forestry, Harrisburg, Pa.
*Smith, Edgar H.,	1911	Department of Forestry, Harrisburg, Pa.
*Smith, Edward S.,	1916	Pine Grove Furnace, Cumberland Co., Pa.
*Smith, Homer A.,	1916	East Waterford, Juniata Co., Pa.
*Stadden, Robert W.,	1914	Greentown, Pike Co., Pa.
Staley, Lewis E.,	1906	Mont Alto, Franklin Co., Pa.
Strobeck, John L.,	1909	Analomink R. D., Monroe Co., Pa.
Thomson, Harry A.,	1909	Box 539, Wesleyville, Erie Co., Pa.

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*In Military Service, U. S. Army.

GRADUATES—Continued.

Name	Class	Address
Vail, H. Lawrence, ...	1910	
*Van Horn, Harry C., ...:	1914	Conrad, Potter Co., Pa.
Warfield, D. Kerr, ...	1910	Muddy Creek Forks, York Co., Pa.
*Wells, Arthur B., ...	1911	Field Station, Lycoming Co., Pa.
Williams, John R., ...	1909	Pine Grove Furnace, Cumberland Co., Pa.
Windle, S. Warren, ...	1917	Parkesburg R. D. No. 2, Chester Co., Pa.
Winter, Raymond B., ...	1910	Mifflinburg, Union Co., Pa.
Witherow, John L., ...	1907	Metal, Franklin Co., Pa.
Woof, Charles E., ...	1914	Deceased.
*Zerby, Charles E., ...	1913	Medix Run, Elk Co., Pa.

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*In Military Service, U. S. Army.

Commonwealth of Pennsylvania

DEPARTMENT OF FORESTRY

BULLETIN NO. 19

REPORT

OF THE

Chief Forest Fire Warden

FOR

THE YEAR 1918

Issued by Direction of the Commissioner of Forestry

HARRISBURG, PA.:
J. L. L. KUHN, PRINTER TO THE COMMONWEALTH
1919

"EVERY LOYAL CITIZEN OF PENNSYLVANIA
WILL DO HIS BEST TO PREVENT AND
EXTINGUISH FOREST FIRES."

Commonwealth of Pennsylvania

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PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN,
Commissioner of Forestry
IRVIN C. WILLIAMS,
Deputy Commissioner of Forestry

BUREAU OF FOREST PROTECTION

GEORGE H. WIRT,
Chief Forest Fire Warden

HOWARD W. SIGGINS,*
Clerk

Ethel Lauder Straw,
K. Irene Geiser,
Stenographers.

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*With 10th Engineers (Forest) A. E. F., France.

LETTER OF TRANSMITTAL

Hon. Robert S. Conklin,
Commissioner of Forestry.

Dear Sir:

It is a pleasure to submit to you my fourth annual report as Chief Forest Fire Warden, covering the work of the Bureau of Forest Protection during the year ending December 31, 1918.

The results accomplished in the face of discouraging conditions are gratifying. They are merely an intimation of what may be done under favorable peace-time conditions with an adequate fund to complete our protective organization, to keep every link of it always effective, to furnish permanent and temporary equipment, and to conduct a vigorous and constant campaign of education.

The outstanding features of the year's work are the continued loyalty of our wardens, the results of organization, of education for fire prevention, and of the holding to account of those responsible for fires.

Yours respectfully,
GEORGE H. WIRT,
Chief Forest Fire Warden.

Harrisburg, February 1, 1919.

ONLY 57 FIRES OF THE 1,625 REPORTED BURNED MORE THAN 1,000 ACRES EACH, BUT THEY BURNED MORE THAN 50% OF ALL THE AREA BURNED OVER.

FOUR HUNDRED AND TWENTY FIRES BURNED MORE THAN 100 ACRES EACH AND THESE FIRES WERE RESPONSIBLE FOR OVER 90% OF THE AREA BURNED.

LARGE FIRES ARE THE RESULT OF SMALL FIRES UNEXTINGUISHED PROMPTLY

SHALL WE PREVENT FOREST FIRES OR MERELY CONTROL THEM?

The sooner we recognize the human side of the forest fire problem, and exert our efforts to change it, so as to have it in our favor, the sooner the solution of the problem may be obtained. Of course, the forest will burn as long as trees produce leaves and branches fall to the ground and become dry as tinder. Some of the debris may be cleaned up and disposed of at a certain expense and to the satisfaction of some people. The fuel for fires can be regulated to a certain extent. The fire itself can be extinguished under even unusual and unfavorable conditions, but this work too, is more largely dependent upon human, than upon physical factors.

But how are fires in forests started? Spontaneous combustion may cause a few. Lightning causes a few—probably ten or twelve a year. The other 1,500 or 2,000 are caused directly or indirectly by the deliberate action of man. Of course, a few are started by irresponsible individuals. Unquestionably the prevention of fires is a human problem. Why does any individual with brains permit a spark to come into contact with highly inflammable, extensive and valuable property, as for example a forest? Perhaps psychology may give the answer. Common sense certainly will. But at any rate there must be a study of local relationship. The so-called careless fires do just as much damage as the intentional fires. Why are the people careless, or why do so many accidental (?) forest fires happen in spring and fall, and not so many in winter and summer?

How, then, can the minds of men be reached so as to change their attitude from one of thoughtlessness and indifference to one of carefulness, of community interests? Even without this change fire extinction, the physical operation, is not a difficult operation wherever force is available for the purpose. But in the majority of cases this means men, women, and boys with equipment. How is it possible to get this force? Was there willingness or unwillingness? Even though this force was present under duress, who exerted the pressure? Was it law? Who enacted the law, or who would enforce it? No matter from what angle you look at it, you face a human problem.

The only logical way we have of producing change in the human mind is by education. It is well to investigate and tabulate causes, but it is better to control and extinguish fires when they occur. To do these things there must be an organization large enough to cover the forests to be protected. There must be a head to the organization and sufficient help to keep it going. There must be inspection, and there must be a number of alert, interested, efficient men ready to do promptly, whatever must be done. Fires must be detected promptly, reported promptly, extinguished promptly. A force of helpers and sufficient equipment must be available at a moment's notice. Other details must be worked out, and through all the details runs the human element that can't be avoided.

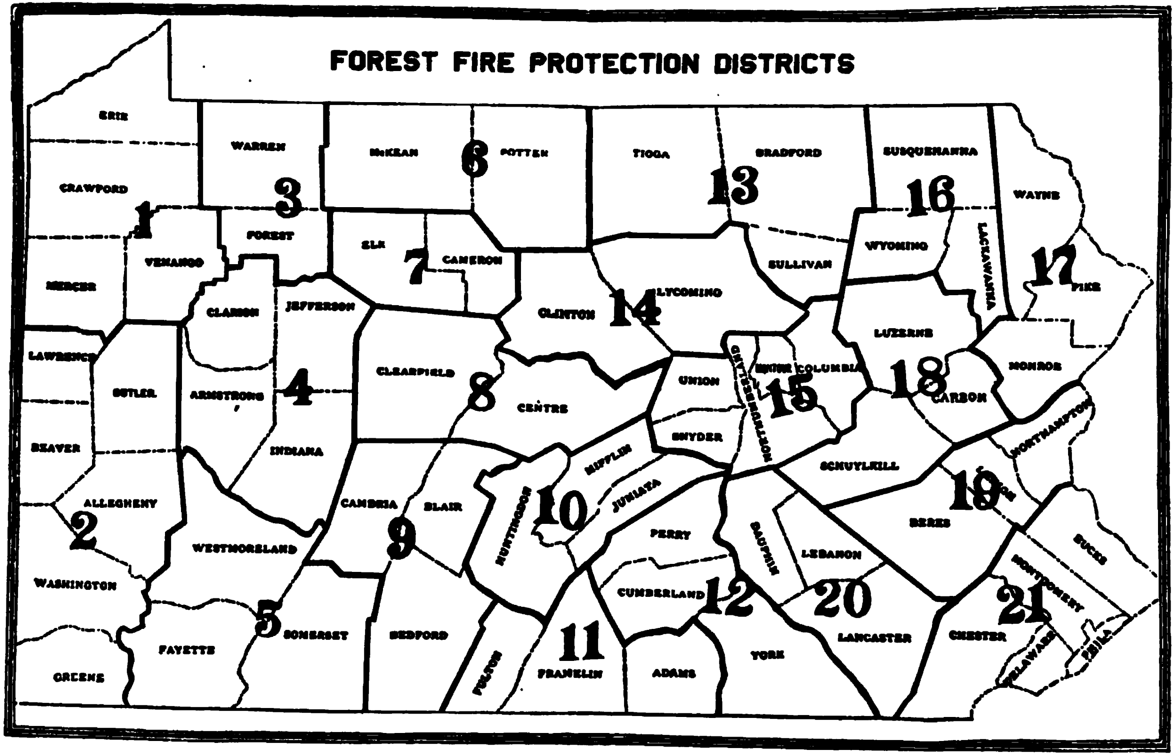
We need in Pennsylvania a more compact organization for fire control. We have advanced about as far as we can now, without funds to employ supervising fire wardens. The local wardens are a splendid body of men, but there are things they cannot and will not do until some one else does it with them and for them. We must have our State divided into districts according to our present law and a district forester or district fire warden, a forester, in each district. Under present conditions there is work enough to keep 21 such men busy every minute of their time. These could be reduced gradually to probably 13 or 14.

For prompt detection of forest fires, we must have as soon as we can get them, at least 100 primary stations of observation on high mountains, and at least 100 secondary stations. In the majority of places this will demand steel towers, with steps, enclosed tops, cabins, equipment, and telephonic connection. New Hampshire has 39 such towers. New York has 36 and expects to build more. Other states are building them. Needless to state a tower is no good for fire detection without a live man on it and without another live man within reach of the other end of the telephone line. Some patrolmen must be employed, in spite of towers. During extreme conditions there will be need for not fewer than 300 men for this work. Under fair or average conditions the number may not exceed 150. New York paid in 1918, something over $7,000.00 for 13 observers.

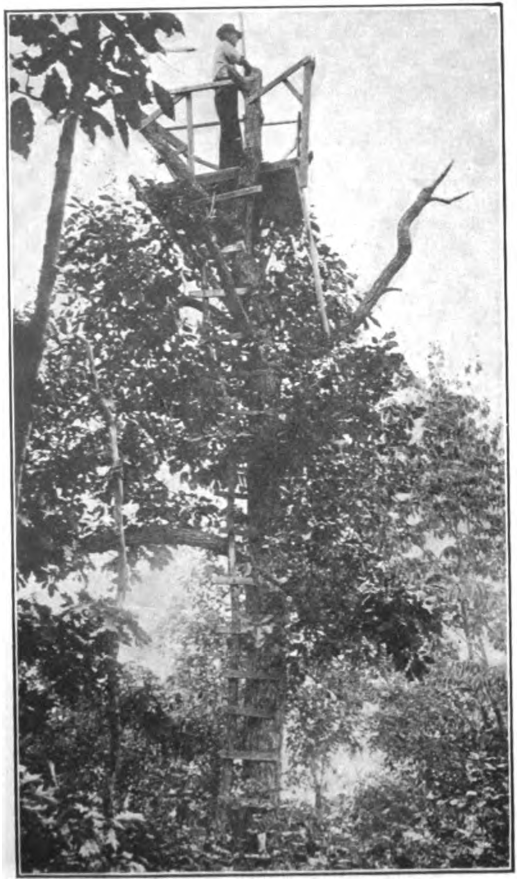
The fire wardens and their men find old methods of fighting fire with sticks and brush too slow for the standards we propose to them. They continually ask for better equipment. To give each warden an efficient equipment of torches, axes, saws, sprayers, brush cutters, etc., a small sum could be expended judiciously and much loss could be prevented. But the equipment should be complete and in a convenient tool box. This is not a new idea either, for other states and the National Government are supplying these things to their forest guardians.

The men must be organized into crews and they must be used as men, not machines. They must be given a decent wage, they must get to and from the fire, they may need food, and they always need water. These expenses must be provided for and should be paid promptly, not a month or more after service has been rendered.

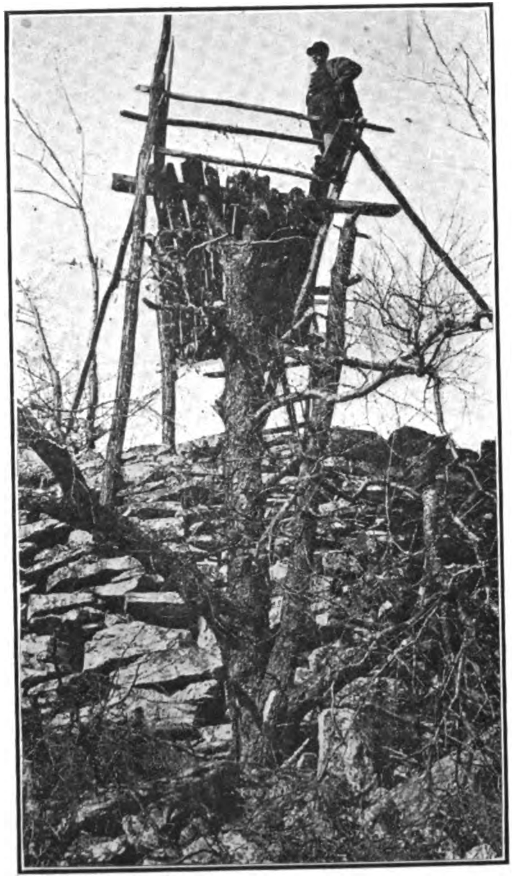
To complete the organization outlined above within the next 5 years, and to take care of current fires, will require a sum of not less than $290,000.00 per year. This is a large figure, when compared with the appropriations for the purpose in the past. They ranged from $45,000.00 to $80,000.00 for two years, not counting de-



FOREST FIRE PROTECTION DISTRICTS



"Cow-catcher" Tree Tower on Oak Knob, Mont Alto Forest (1909). Twenty-eight feet.



Tree Tower on Tussey Mt., Barree Forest (1910). Thirty feet.

ficiency appropriations. But the annual loss from forest fires is close to $50,000,000.00, and the amount needed for protection is only a little over one-half of one per cent. of the loss. This is not a high rate of insurance by any means. No good business man would hesitate to spend $290,000.00 a year if he could save thereby $50,000,000.00 or even half that amount. Why do State Legislatures and Governors hesitate to approve an amount with which to accomplish so much good when they have provided a means by which more than this may be spent for the protection of game? It is an acknowledged fact that game is but an adjunct of the forest. The answer again is that the human side is paramount. The pursuit of game, fish, recreation, etc., is an immediate and personal proposition, while growing trees, furnishing labor, influencing stream flow, climate, agriculture, etc., are things of the future, and abstract propositions for the other fellow.

If forest fire control is good, forest fire prevention is better. From what has preceded it can be seen that this reduces itself to a campaign of education. This must be begun now and continued without let up until every individual in this Commonwealth or who comes within its borders knows that fire and forest can be combined, only at the risk of great loss and severe penalty. This must keep up until the idea becomes second nature and until parents teach it to their children as one of the fundamentals of our economic relations. Certainly this cannot be accomplished over night, nor by the passage or enforcement of any law or number of laws. We cannot expect a reasonable appropriation with which to begin real work until this campaign has progressed somewhat. It is the duty therefore, of everyone interested in forestry and forest conservation to get busy and educate himself and his neighbors so that a real advance in forest protection may be taken in Pennsylvania.

Means and ways must be found to implant the idea of forest protection in the minds of our school children. We must find and take advantage of the point of contact between protected forests and the laborer, the farmer, the merchant, the doctor, the preacher, the lawyer, the engineer, the professional man of every kind, the hunter, the fisherman, the camper,—in fact the man, woman, and child in every walk of life. This is not a small job and will require no small expenditure of money. Persistence and repetition, line upon line, must bring results.

Law enforcement is a part of an educational campaign, but respect for law in general is something better. At present there seems to be no respect for forest law, and it is most difficult to find an attorney or a judge who believes that anyone should be punished for firing the woods. In the face of law and morals the act is regarded as nothing more than an accident and something to be excused by God and man. No inherent right exists by reason of which property may be destroyed. Our Government does provide for the ownership of property and for the protection of that right. Interference with and encroachment upon such a right is prohibited by law; and yet, in Pennsylvania, individuals and corporations may go the limit to destroy their own and their neighbor's property. Upon a statement to the effect that the fire's escape could not be foretold or prevented, the guilty is released and the innocent owner and community suffer. How long will an enlightened people stand for such a condition of affairs?

Success is certain with the expenditure of sufficient funds. Success is not to be expected with insufficient funds. "Nothing succeeds like success." The Legislature will not be asked to bankrupt the State in behalf of forest protection, although it is in a fair way to do so by not supporting forest protection. Whatever is asked will be below the amount actually needed.

BRIEF STATEMENT OF WORK OF THE BUREAU OF FOREST PROTECTION DURING THE YEAR 1918

Forest Fire Warden Organization

It has been our aim to have a sufficient number of forest fire wardens so located that practically no forest land within the Commonwealth is without some kind of supervision, and so that whenever forest fires arise, there is someone within easy reach to take necessary steps to extinguish the fires. Our organization now comprises about 1,475 men, but lacks complete effectiveness because of our inability to fill up the gaps which exist here and there, and our inability to supervise satisfactorily the activities of this number of men.

We have endeavored to keep the men interested and active. This of course, has required the issuance of circulars and a large amount of correspondence. We have supplied each warden during the year with a large envelope which makes it convenient for him to keep all of his forest fire forms and correspondence together.

Fire Towers and Telephone Lines

With co-operation of the Anthracite Protective Association there have been built two sixty-four-foot steel towers in Carbon and Schuylkill counties. One forty-five-foot wooden tower has been built on the State Forest in Centre County.

Telephone line was completed to the steel tower erected on State Forest in Potter county in 1917, and to the steel tower erected on State Forest in Union county in 1917. Also, to the steel tower erected in Carbon county this year, and to the wooden tower in Centre county. Considerable work was done on the extension of a telephone line through the Brush Valley Narrows in Union and Centre counties. Other telephone projects were mapped out but could not be completed.

Co-operation

We have co-operated during the year with the Pocono Protective Fire Association, the Anthracite Forest Protective Association, and the McKean County Protective Fire Association. These associations have increased in membership and in activity and are doing good work.

As heretofore, we have had the co-operation of the State Police in obtaining evidence and in the arresting of individuals responsible for forest fires.

We have endeavored to obtain more satisfactory co-operation from the railroads of the State and satisfactory results have been accomplished. More claims have been settled this year than ever before and the railroad officials are putting into effect more protective measures than ever before.

Through our efforts the Railroad Administration has taken up with all of the Foresters of the Eastern States, the matter of adopting minimum uniform rules and regulations for the prevention of fires along railroad rights-of-way.

Patrol

Our patrol service in 1918 was not so extensive as that in 1917. The highest number we had employed was in the month of May, when there were 64 men. We had patrolmen on duty during the months of March, April, May, June, October, November, and December.

Legal Affairs

During the year about 30 cases were handled in which some legal action was taken. We cannot say that much has been accomplished in this way, but the cases have attracted attention at least and we have reason to believe that they have made a number of people think about the necessity of forest protection.

We have collected from persons responsible for forest fires and turned into the State Treasury, $5,660.85. Over half of this amount was for damage to State Forests and went into the State School Fund.

Educational Work

By reason of personal correspondence, addresses, distribution of posters, printed and mimeographed circulars, and our report for 1917, we were able to reach a great many people. The wardens were encouraged to get in touch with public schools and individuals, especially those who owned engines of various kinds and with those who expected to do any kind of burning.

The Retail Lumber Dealers of Pennsylvania, donated to us two pages in their directory for advertising material. A number of articles were written for different publications.

Forest Fires

We have endeavored to obtain a complete record of forest fires occurring within the State, and we believe that we have received reports of fully 90% of all fires that occurred. The handling of the reports and the auditing of the bills has required a great deal of correspondence and time.

Miscellaneous

In addition to all of the above, the force in the Bureau of Forest Protection has assisted in a great many things in connection with the general Department work, both in the office and in the field.

EXPENDITURES FROM 1917 APPROPRIATION

Approved Between January 1 and December 31, 1918

Chief Forest Fire Warden, salary,	$2,499 96	
Chief Forest Fire Warden, expenses, 1917,	26 40	
Chief Forest Fire Warden, expenses, 1918,	299 61	
Stenographers, salaries,	1,815 00	
Stamps and postals,	495 66	
		$5,136 63
Expenses of Foresters, 1917,	$69 44	
Expenses of Foresters, 1918,	845 10	
Legal expenses,	2 85	
Advertising (Bell directories, 1917),	17 85	
Oaths, 1917,	2 50	
Oaths, 1918,	29 30	
Spencer delineascope and gas tank,	70 80	
Osborne range finder,	48 00	
Meeting of Fire Wardens,	40 51	
		$1,126 35
Associations for 1917,		$12 05
Associations for 1918,		1,545 81
Towers,		548 89
Tools and equipment,		59 08
Fall patrol, 1917,		58 25
Spring patrol, 1918,		2,150 60

Fall patrol, 1918,	507 30
Fire extinction, previous to June 1, 1917,	195 24
Fire extinction, since June 1, 1917, to Jan. 1, 1918,	721 97
Fire extinction since Jan. 1, 1918,	25,221 18
	$37,283 35

SUGGESTIONS

Some of the things which we know must be done and done soon are set forth here. This by no means covers all the needed work, but it will indicate at least that there is sufficient work of importance to keep a large force of men busy and to require an appropriation commensurate with the results that can and must be obtained.

1. Keep the FOREST FIRE PREVENTION idea uppermost and rush educational work of all kinds.

2. Establish a supervisory force to consist at first of twenty-one district fire wardens and later to be reduced to thirteen.

3. Complete organization of local forest fire wardens to consist of between 1,500 and 1,600 men.

4. Equip wardens with proper tools, including rakes, brooms, torches, axes, saws, etc. (73 townships in Massachusetts have motorized equipment for forest fire work.)

5. Maintain interest and activity on part of wardens—circulars, bulletins, reports, posters, conferences for their work, county meetings, etc.

6. Erect 100 steel primary towers and 100 secondary towers. Equip towers with cabin, tools, maps, range finders, telephones, etc.

7. Employ observers and patrolmen sufficient to cover danger periods in danger regions. This will require a force of from 200 to 450 men.

8. Complete the forest map of the State, so as to locate areas to be protected, fire hazards, etc., and to establish the protection of forests upon a regional basis.

9. Extend the co-operative work of the bureau to help individual owners establish more associations.

10. Get necessary amendments to the present laws in order to render conviction for setting fire more certain; to establish definite responsibility for damage, to oblige owners of land to insure better protection to their forests and to make them more careful with starting fire on their own lands, and to require the control of such fires within their own limits; to change compensation of wardens; to declare certain forest conditions and certain equipment near forests public nuisances; and to clear up certain other defects in present law.

11. Make definite arrangement whereby we may employ local attorneys to handle our forest fire cases in order to insure some degree of fairness in their handling.

12. Request an additional force of State Police in order that we may have definite details from the force to investigate the origin of fires, collect evidence and start legal action when necessary, relieving the local fire wardens of much of the kind of work for which they are unfitted.

13. Draft fire prevention rules for railroads and have them passed upon and put into effect by order of the Public Service Commission.

14. Make detailed studies of the effects of forest fires on forest growth in different parts of the State and determine a better basis for appraisal of damages.

FIRE WARDEN ORGANIZATION

During 1918 it was a difficult matter to maintain the enthusiasm of a fire warden organization, largely due to war conditions. Some of the men themselves went into the National Army; in other cases the sons of our wardens left home either to enter the Army or to take up more profitable work. Many of the men felt that they could not attend to their own affairs and the duties of the forest fire warden at the same time. Other men found that a scarcity of men in their neighborhood made it necessary for them to extinguish fires almost alone or only with the help of boys and women. Still others found that on account of the high rate of wages, they could not induce men to leave their regular jobs in order to fight fire at twenty cents an hour, and they did not care to incur the ill-will of the men by compelling them to go under penalty of fine. These conditions were more or less general, but records show that only about 125 men were dropped from our list. Although the same conditions made it difficult for us to obtain new wardens, yet the new appointments for the year also amounted to about 125.

There is still a number of places in the State where we need additional fire wardens. It is doubtful if very much more can be done toward closing up the gaps in our organization until the provision of the law with respect to district foresters or district fire wardens is taken advantage of.

I cannot speak too highly of the attitude and work of our present wardens. With very few exceptions, we have an organization of men who realize the necessity of forest protection and who are doing all they possibly can to educate the people of their community, both to prevent fires and extinguish promptly those which do occur.

There are very few localities in which various improvements in our organization are not needed, especially in the way of furnishing equipment for fire extinction and in the matter of eliminating fire hazards. The wardens are ready to do their share of the work, just as soon as they are informed what is expected of them.

There is a duty which devolves upon the fire wardens, however, for which they are not adapted, viz., the collection of evidence establishing responsibility for forest fires. This work demands special qualifications, together with a knowledge of what constitutes satisfactory evidence in Court. Our wardens have made satisfactory progress in this work, and possibly in time they will become accustomed to it, and the results will be as good as can be expected under such conditions. It occurs to me that a better arrangement would be to have available for our use an increased number of State Police to whom this work could be submitted and from whom we could get the necessary co-operation, not only to collect evidence, but also, to start legal action wherever and whenever the evidence warrants.

FOREST FIRE WARDEN MEETINGS

There were no meetings of wardens in 1918, except that held in co-operation with the Pocono Protective Fire Association in Monroe county. This was not due to the fact that we have in any way been disappointed as to the value of such meetings, but entirely to the fact that we considered the amount of money available for protective work insufficient to be used for this purpose. There is no question, but that these meetings should be held in all of the counties of the State at regular intervals.

Monroe County, March 23, 1918

The forest fire wardens of Monroe county and those of townships in other counties bordering upon Monroe were guests of the manager of Buck Hill Falls Inn, who is a director of the Pocono Protective Fire Association. There were present four members of the Board of Directors, the district forester of Monroe county, twenty-eight fire wardens, county game protector, a representative from each of the three Stroudsburg papers, president of the Monroe County Resort Association, who was also chairman of the Public Safety Committee, representatives from the Wilkes-Barre & Eastern R. R. Co., Delaware, Lackawanna & Western R. R. Co., two representatives of the Lehigh Coal & Navigation Co., the chief forest fire warden, and several other visitors.

Mr. Edwin A. Hoopes, president of the Pocono Association, opened the morning meeting, briefly calling attention to the improvement in sentiment and actual protection of forests within Monroe county. Mr. Charles N. Thompson, director of the association, the host of the day, welcomed the wardens, speaking particularly about the necessity of fire prevention as the basis of conservation generally, the protection of streams, woods, bird life, and of everything that depends upon them. By reason of care of birds on the Buck Hill Falls property, there was a noticeable decrease in the number of insects and their destructive work.

The chief forest fire warden spoke of the discouragements which have developed in connection with forest protective work, but that in the face of these discouragements, the opportunity was open to the fire warden to do that much greater work for himself and for his community. He again called the attention of the wardens to the necessity of complete organization and preparation for fires previous to their occurrence, and the further necessity of promptness as soon as they do occur.

Mr. J. A. Seguine, vice-president of the association briefly reviewed the history of the association since its organization and particularly the work since its re-organization. He asked the wardens and others to consider the subject of forest protection from the standpoint of the question, "What Have I Done to Replace What I Have Used?" He asked the wardens to assist materially in increasing the membership for the association during the coming year.

At this point in the program, the wardens enjoyed a good dinner, following which the district forester, John L. Strobeck, opened the discussion of current problems of the fire wardens.

Mr. Charles F. Berkey, engineer of the Lehigh Coal and Navigation Company, referred to the fact that nine years ago he had to threaten the constable with prosecution for the non-performance of his duty, in order to get him to help fight a forest fire. Credit is given to the Pocono Association for the fact that the present forests are in existence, and he made the statement that Monroe county could not exist, if it were not for the forests which attract outside people. He brought out the fact that the forest will protect the fish and game, but neither the fish or the game can support or protect forests.

Representatives of the Delaware, Lackawanna & Western R. R. Co., the Wilkes-Barre & Eastern R. R., promised the association their co-operation in the matter of burning safety strips along the rights-of-way, and of otherwise assisting in forest protection, whenever and wherever they could.

John Perdy Cope, president of Monroe County Resort Association, spoke at length of the importance of the forests in general and in particular to Monroe county, and expressed the opinion that care of the forests at all times should take precedence of the care of fish and game as with the care of the forest, fish and game naturally would follow.

Representatives of the newspapers asked the wardens to supply them with frequent items and one representative in particular admitted that as a result of the meeting he had been converted to the subject of "Forest Protection," having come there as an outspoken antagonist to the proposition.

COMPENSATION OF EMPLOYEES

On May 19, 1917, Daniel P. Carsnitz, Powl's Valley, Dauphin county, fell and broke a bone in his wrist. In accordance with the law providing for compensation of employees, claim was made in behalf of Mr. Carsnitz and the Commonwealth paid him $17.50. He is entitled to receive from the Commonwealth, $10.00 additional for medical services.

Owing to the fact that the Legislature of 1917 made no provision for paying compensation to State employees, the following claims are dependent upon the action of the Legislature of 1919.

On November 10, 1917, Colfax Eller, Hopewell, Bedford county, was struck by a stick, having the left eye badly injured. After a careful investigation, it has been determined that Mr. Eller is entitled to $781.25 for compensation, and to $25.00 for medical services.

On May 6, 1918, Seymour Foote, East Stroudsburg, Monroe county, while attempting to cross a fire line, stumbled and fell into the fire and was severely burned about the face. Mr. Foote is entitled to $8.33, for compensation and $12.25, for medical services.

On May 6, 1918, Walter Reffner, Woodward, Centre county, was taken from his regular employment in order to assist in the extinction of a forest fire. He jumped from a moving auto and in doing so his left foot was run over and bruised. He is entitled to $12.50 compensation and $10.00 for medical services.

PATROL SERVICE

Patrol service during 1918 was by no means so satisfactory or complete as it should have been. So far as it went, satisfactory results were obtained. One patrolman caught over 45 small fires and extinguished them before they were large enough to do any damage worth reporting. This was along the Baltimore & Ohio Railroad, right-of-way. Other patrolmen did not come in contact with so many fires but their presence in the forests certainly prevented a number in regions where, heretofore, many fires occurred. We had requests for the appointment of patrolmen sufficient to have kept at least 150 men busy, and conditions throughout the State, in the spring especially, were such that a great many more than this could have been employed and their service would have materially reduced the total number of acres burned over and the total amount of damage done.

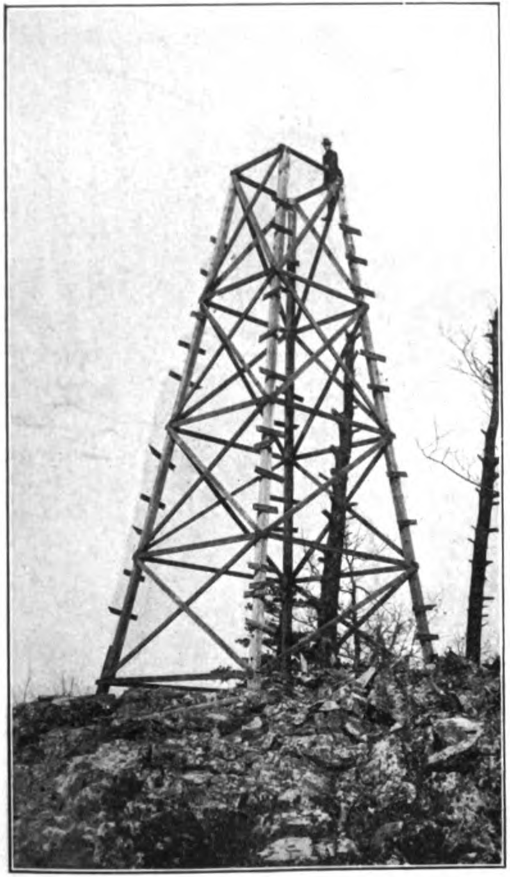
SUMMARY OF PATROL SERVICE 1918

County.	Number of Men.							Paid by department.	Paid by association.	Paid from Bureau of Forest Protection appropriation.
	March.	April.	May.	June.	October.	November.	December.			
Adams,				1						$21 60
Bedford,		3	5			2	1			187 90
Blair,		2	2		1	1				277 58
Cambria,		4	4		3	3				440 00
Cameron,		1	2							108 15
Centre,	5	6	4		3	3		$240 05		386 36
Clearfield,		2	2					128 73		
Cumberland,				1						22 50
Dauphin,	2	2								42 98
Elk,		2	2		3	2		123 60		97 85
Fayette,	2	3	3		2	3	1			89 34
Franklin,		6	9		7	10	1	140 40		102 75
Fulton,		8	11		1	10	1	86 00		118 50
Huntingdon,		2	2		1	2		81 64		75 00
McKean,	1								$6 70	6 70
Mifflin,	2	2	2	1				268 00		
Monroe,	5	7	6		6	6	4		606 75	609 95
Potter,	3	4	3	1	1	1		140 00		297 88
Somerset,	2	4	2		3	3		12 00		99 98
Tioga,		2	2							151 50
Union,		1	1							67 50
Westmoreland,	2	2	2		1	1				*106 50
	24	63	64	4	32	47	8	$1,220 42	$613 45	$3,255 24

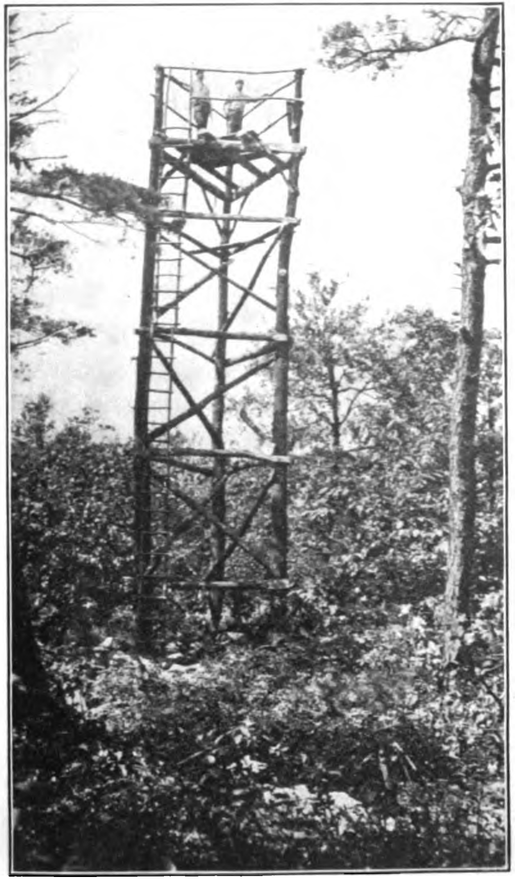
*$2.78 refunded.

FIRE TOWERS

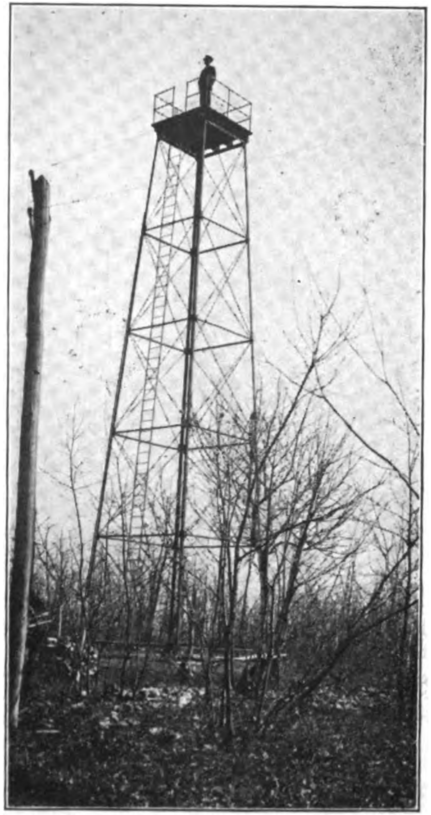
Fire towers are necessarily a part of an effective forest fire protective scheme for Pennsylvania. Since 1903, especially in connection with the protection of State Forests various kinds of towers have been erected. Some are very crude and scarcely can be called towers. A few boards nailed to the branches of a tree serve the purpose. They afford an elevation for observers and are better than nothing.



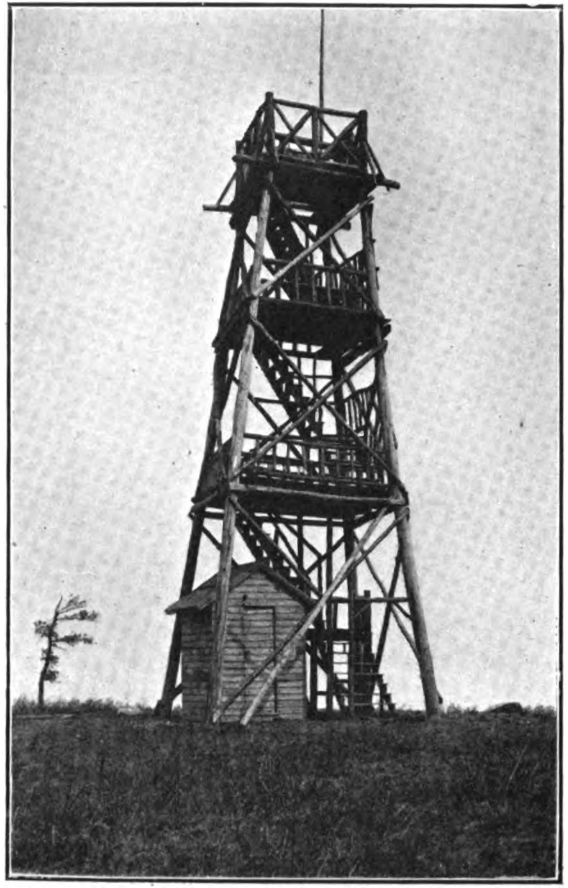
Knob Tower, before completion, Mont Alto Forest (1912). Forty feet.



Triangle Tower. Kishacoquillas Forest. Branches removed from 3 trees (1914). Forty feet.



Steel Tower on Pine Mt.
Mont Alto Forest (1914). Fifty feet.



Wooden Tower on Cresco Heights (1916).
Thirty feet.

In and near State Forests, there are 92 trees used for fire observation stations. There are 35 wooden towers and 9 steel towers. All of the steel towers and most of the wooden towers have telephone connections.

The Pocono Protective Fire Association has erected three wooden towers and uses an additional one:

A twenty-five-foot tower at Tunnell Hill near Mt. Pocono, built in the spring of 1915.

A twenty-five-foot tower in Smithfield township, built in the spring of 1915.

A thirty-foot tower on Cresco Heights, built in spring of 1916.

They also use what is known as the Bailey tower, which is twenty-five feet high and located near the Pocono Manor. A telephone line connects with each of these towers.

The Anthracite Forest Protective Association now has two steel towers. In April 1918, a sixty-four-foot steel tower was erected on Broad Mountain, Packer township, Carbon county. The tower erected cost $415.00. The purchase and erection of 74 telephone poles cost $481.00, brushing 7 miles of right-of-way, cost $75.00. This expense was divided equally between the association and the bureau of forest protection. In May 1918 a similar tower was erected on Sharp Mountain, south of Brockton, Blythe township, Schuylkill county. This tower and its erection cost $462.00 which amount was equally shared by the association and this bureau. No telephone connection has been made at this tower.

In June, iron steps were erected on the steel tower on the State Forest near Cherry Springs, Potter county. The Gray Chemical Company and the National Chemical Company contributed $71.25, each, toward the purchase of these steps, which was half the amount paid for the steps. This bureau paid $142.50 on the steps, and all of the costs of erection, $208.99. It is well worth noting here that all of our towers should be equipped with steps instead of ladders. They not only insure the Department against compensation claims which might arise from injuries sustained by our observers in using towers, but they also make it possible for the towers to be used by people who frequent the forest. In this way the towers serve as a valuable educational adjunct, by advertising not only the forests, but the forest protection scheme and the necessity therefor.

In September, Forester Silvius completed the erection of a forty-five-foot wooden tower on Round Top within the Buffalo Forest near Woodward, Centre county. This is a secondary tower between a sixty-foot steel tower on Sand Mountain within the White Deer Forest and one which we hope to have erected on Big Poe Mountain within the Penn Forest. Plans and specifications for this tower were devised for use on the National Forests of the West. Specifications were followed closely and it was discovered that for our purposes quite a few changes could be made which would result in a considerable saving of expense. On account of the high price of steel during the war periol, it was thought it would not be so expensive as a steel tower. However, the statement of expenses which follows shows that it cost almost $200.00 more than a sixty-foot steel tower did in 1917. The bureau of forest protection paid $186.61 toward the erection of this tower. The balance of the expense was paid from the general Department funds.

COST OF TOWER

Clearing and laying off site,	$66 70
Foundation,	107 45
Cost of materials,	352 75
Planing tower timbers,	20 50
Framing tower,	41 00
Erecting tower,	140 50
Painting tower,	44 32
Hauling heavy timbers and lumber,	38 68
Total cost,	$811 90

COST OF TELEPHONE LINE

Right-of-way,	$3 00
Wire, insulators, etc.,	34 85
Erecting poles,	60 08
Stringing wire and placing guys,	10 00
Total cost.	$107 93

Length of line, 5,050 feet.
Cost per mile, $112.74.
Annual rental, as per contract with the Woodward Rural Telephone Co. exclusive of battery replacements, $12.00.
Above rental covers free service to nearly all points in Centre county over the existing Bell system.

In September, authority was granted to Forester Bearer to erect two towers in co-operation with two of his fire wardens, providing the State's share of the cost would not exceed $40.00, in each case. One is to be erected in Cook township and the other in Ligonier township, Westmoreland county. These towers were not completed at the end of the year.

On December 7, we received an Osborne range finder for use on towers. This was purchased from the Western Conservation Association.

TELEPHONE LINES

Of particular interest in connection with our forest fire work was the extension of the State Forest telephone line in Potter county, running from Carter Camp to the Cherry Springs tower, a distance of about thirteen miles. A line was also built from the Forest House to the tower on Sand Mountain, in Union county. This line was about four miles long and is a part of the proposed line extending throughout Brush Valley Narrows to Livonia. The right-of-way for this line was obtained and a large proportion of the work completed during 1918. As previously mentioned, a telephone line of almost a mile in length was built to the Round Top tower in Centre county, and a line about one mile long was also extended to the Broad Mountain tower in Carbon county. In Pike county a line of about three and one-half miles was built to High and Low Knobs. The State Forest line on the Bear Meadows Forest was extended several miles.

At the present time the use of the telephone is our most convenient and economical method of promptly reporting fires and of getting men together to extinguish them. It is absolutely essential that we rapidly extend the telephone system through State Forests and into and through other forest regions. In some cases we now have fire wardens located ten or more miles away from sufficient help to control promptly a fire in unfavorable seasons of the year, and without telephonic communication thousands of dollars worth of damage may be done before help can be obtained. The installation of telephone service would be more than paid for in the protection afforded by the prompt suppression of any one fire.

In the development of telephone facilities we have little or no cooperation on the part of the telephone companies operating within the State. Rates have been high and quite frequently unsatisfactory arrangements respecting toll charges have developed due to the districting of the State by the telephone companies. An effort was made to overcome some of these difficulties and to obtain satisfactory conditions by taking the matter up with the Federal Administrator and the following letter was written to Postmaster General Burleson:

"The Pennsylvania Department of Forestry has erected and maintains at its own expense, or in co-operation with protective associations, a number of forest fire observation towers. To make these towers effective, it is necessary to have them connected with local telephone lines. The necessary extensions have been built by or under the direction of the Department. The towers are in active use for protective purposes only from four (4) to six (6) months of the year.

"In arranging for connection at our towers, the local companies have insisted upon our paying a full year's rental and the installation of their phone boxes, both of which propositions we desire to have modified.

"It is more satisfactory to us to use a portable 'phone case because many of the towers will have no inclosure upon them and because we desire them to be open to the public generally. Necessarily a permanent 'phone is in danger of misuse and of being put out of commission when it may be most in demand. The style of 'phone box used by us is Western Electric 1375B, equipped with 2,500 ohm buzzers and can be attached to or disconnected from any line by our own men without interference with the efficiency of any other 'phones on any line and without any expense to the local company.

"With the above arrangement we believe that we should be charged for service only during the months during which the towers are in use. Further we believe that the Commonwealth should be given preferential rates for its forest fire work because forest protection is of value to every telephone company on account of its timber needs, and because we are constantly encouraging the installation of 'phones by our fire wardens and by others living near and within forested regions.

"We also desire some special consideration in rates for space in telephone directories for the publication of our lists of forest fire wardens.

"Under 'free calls' may the words 'forest fire' be inserted among others listed in telephone directories?

"May we have a general ruling to the effect that when a forest fire call comes to any central, one of our forest fire wardens, whose name shall be posted in the central, shall be called immediately and that any other connections with the fire call be considered as emergency business?

"When a forest fire warden has a telephone, may the words 'forest fire warden' be placed after his name in the directory, without extra charge either to him or to the Department?

"In case of toll charges for forest fire messages, may it be understood that the connection be promptly made and that if the charges are not paid by person sending the message, the bill indicating places between which message passed and the name of warden called, be forwarded at once to the Department at Harrisburg?

"May a general order be issued to the effect that all telephone linemen or inspectors be required to report promptly to the nearest central any forest fire which they may discover in connection with their duties?

"We shall thank you for a careful consideration of these questions and for anything you can do for us under the circumstances."

In answer to this letter which was referred to a local Bell Telephone official, we were able to get absolutely no satisfaction except a change which had already been put into effect by the Federal Administrator providing for the payment for telephones by the month and for the months during which service was rendered, instead of having to pay for full twelve months' service as heretofore.

Notwithstanding the fact that we could get no satisfactory arrangement by reason of which we could obtain at special rates space in telephone directories, we entered into a contract with the Bell Telephone Company of Pennsylvania for the publication of lists of forest fire wardens in ten of their directories during the year 1919. These ten directories cover all of the State, except the southeastern portion and the extreme western portion where we have few fire wardens and where there is little or no danger of forest fires. On the basis of the last issues of these directories in 1918, there will be approximately 230,000 directories in 1919 having in them lists of nearby fire wardens. These directories are always kept close to telephones and certainly this is the cheapest manner in which we could distribute lists of our fire wardens so as to reach the same number of people. The cost to us averages less than ½ cent per book. At the same time we are getting the advantage of co-operation in notifying the fire wardens, and constant publicity because of the attention which these lists are attracting from telephone users.

NEW FORMS

In 1917 form 15A was devised in order to meet a condition then developing. It was a postal card upon which fire wardens should report large fires promptly to their district forester. Our regular forest fire report, however, was revised and by reason of the prompt action on the part of the wardens in submitting the regular form, it was found that 15A was no longer needed.

The "Patrol Record Books," devised in 1917, were put into effect the spring of 1918 and while they have not been entirely satisfactory, they have proved their value and shown us where some improvements may be made when we have the next edition printed.

Early in 1918, we supplied each warden with a large brown envelope in which he could keep his forms and correspondence. These envelopes have been very much appreciated by the wardens and have certainly been a step toward increased efficiency.

During the year we have devised a postal card form upon which those who receive forest fire checks may acknowledge receipt of the same. This takes the place of an old letter form which was inconvenient and by reason of the change we have saved not only time but considerable postage and at the same time we have had much prompter acknowledgment of the checks sent out.

Our regular Department receipt for service rendered the Commonwealth has been adapted to the use of forest fire wardens and has been number "7A." Our wardens find this form very convenient and it is more satisfactory than the promiscuous styles and sizes of receipts formerly submitted.

Revisions have also been made in several of our circular letters relating to offer of appointments and circulars of information to wardens newly appointed. During the year a synopsis of all instructions issued heretofore to fire wardens has been made and it is to be hoped that a new circular will be issued shortly upon which all of these orders will be brought up to date so that they may be available in convenient form to each warden in the service.

During the year there have also been devised record forms for use in this office for the tabulation of forest fire data as the information is received. These forms have enabled us to have at hand various totals at short notice and while during this year they have required more time than we expected, we have discovered changes which will be put into effect beginning with January 1, 1919, and which will eliminate duplication.

WHAT CAUSES FOREST FIRES

Before a logical and practical plan for their elimination can be formulated, much less put into operation, we must investigate the causes of forest fires. From a study of past causes we may obtain data upon which to work for fire prevention, for we may reasonably suppose that in the future the same causes will continue to result in forest fires.

As fundamental facts it must be remembered that a piece of woodland is a piece of property which is of value. The value is not only to the individual who happens to claim possession, but to the people of the immediate neighborhood and very probably to the State and to the nation. From the inherent nature of forest property there are times when it becomes very inflammable. At such times a small spark of fire may destroy in a few hours what has required years to develop. Once it has been destroyed, man may never be able to replace it, or, at best, it can be replaced only at considerable trouble, time, and expense.

Our next step, then, is to discover how the sparks which cause forest fires, get into the forest. Naturally the first thing we think of are the forces of nature. We know that lightning causes some fires. A careful study of such fires has been made by the U. S. Forest Service and the results were published as Bulletin 111, in 1912. On the National Forests, which are mostly west of the eastern line of Colorado, from 1906 to 1911, lightning caused from 9% to 28% of all the fires reported with an average for the six years of 17%. In the region including the states of Minnesota, Wisconsin, Michigan, Pennsylvania, New York, New Hampshire, Vermont and Maine, an average of about 70 fires per year have been caused by lightning. This is equivalent to a very low percentage of the total number of fires. In Pennsylvania, only 1½% of the 1915 fires, 1% of 1916 fires and .15% of the 1917 fires, or 32 fires in three years out of a total of 4,200 reported, were caused by lightning.

Many more trees are struck than are ignited and conditions at the time of striking are such that the fires seldom become more than stem fires.

Occasionally we hear of fires caused by spontaneous combustion. Such fires are unquestionably possible, but are also most likely to be very few in number.

Other than from these two causes, forest fires originate as a result of human action, and are either intentional, or in the last analysis, the result of carelessness and indifference. "When a man touches a match to a clump of dry brush and a fire results there is a physical action, a mechanical cause of the fire; but the cause of the fire contains another element—the psychological background for the physical action, the mental process, the activity of the man's mind which preceded the act and resulted in his setting fire." This mental attitude may be one of hate, as the malicious incendiary; self-interest, as the huckleberry picker; carelessness, as the brush-burner; mind upon something else than what is being done, what ought to be done, or what ought not to be done, as the camper and smoker; ignorance, as the child and most people; indifference, as railroad employees; irresponsibility, as drunks, lunatics, and idiots.

The following is a classification of causes which is being generally adopted for a study of past causes and for the uniform reporting and classification of future causes.

I. Practically not preventable:
    (a) Lightning.
    (b) Spontaneous combustion.
II. Mostly preventable:

(a) *Incendiary*—All fires maliciously set regardless of whether or not they can be classified under any other head. Purposely burning another's woodland for one's own advantage, apparent or supposed. (Does not include backfiring in good faith.)

To take revenge, or "to get even."
To force the sale of timber.
To force owner of woodlands to purchase interior holdings.
To get job at fire fighting.
To cover trespass or other crime.
To improve pasturage.
To gather nuts.
To uncover minerals for prospecting.
To improve huckleberry crop.
To drive away snakes.
To surround one's own land with a safety belt.
"To see it burn."

(b) *Railroads*—Fires incidental to the construction, operation, or maintenance of all railroads, other than those used in connection with lumbering.

1. From Engines.
   Sparks from smoke stack of locomotives or construction engines.
   Sparks from fire box or ash pan.
   Cinders, waste, or paper thrown off by crew.

2. Right-of-way.
   Burning of right-of-way, new or old.
   Burning ties.
   Fire escaping in any way from section gang, telegraph or telephone line crews, bridge, or other repair or construction crews.
   Fire caused by track walkers, whether employees or trespassers.
   Matches and tobacco thrown from trains.

Individual carelessness of any employee, passenger, or trespasser.

(c) *Lumbering*—Fires incidental to all lumbering operations.

Sawmill engines, whether permanent, temporary, stationary, or portable.
Refuse burners.
Dinkey engines.
Logging locomotives, except such as are common carriers.
Tractors.
Hoisting engines.
Logging camps.
Blasting in connection with logging.
Carelessness of any lumbering employees.
Slash burning.
Charcoal burning and other wood utilization in the forest.

(d) *Burning*
(other than inc
tion.)

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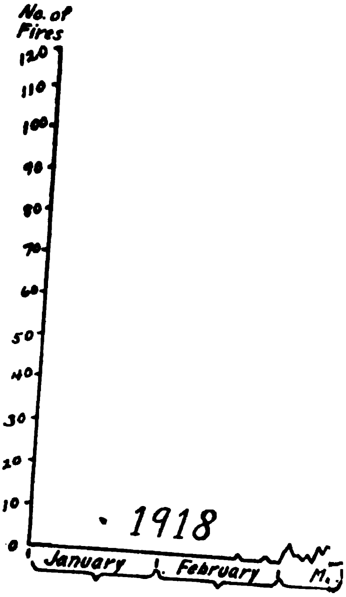

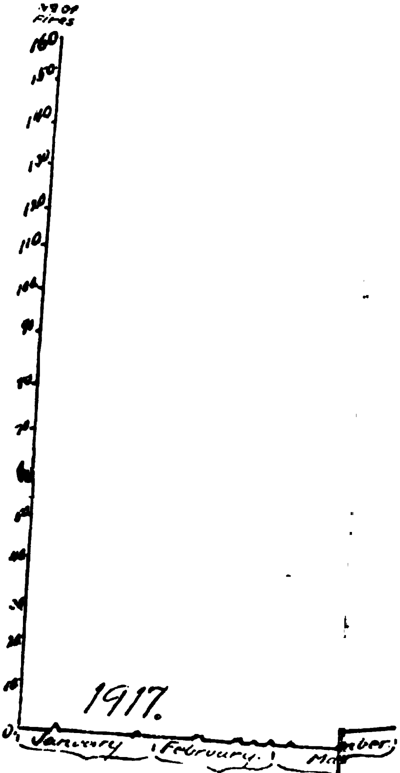

GRAPH

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November	December	Total.
1	1	13
------	------	25
8	3	33
------	------	13
1	1	37
1	------	10
------	------	10
------	------	8
2	------	140
------	------	21
16	------	84
2	------	60
------	------	7
------	------	3
1	------	45
1	------	31
------	1	15
------	------	1
3	2	19
2	1	23
------	------	84
------	------	1
9	------	68
------	------	15
13	11	62
2	1	13
4	1	47
------	------	23
------	------	4
1	------	12
1	------	17
1	------	5
1	1	5
------	------	4
4	------	66
4	------	39
------	------	25
1	2	21
3	1	50

NUMBER 1918 FIRES BY MONTHS—Continued

County.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Montgomery,	------	------	------	------	------	------	------	------	------	------	------	------
Montour,	------	2	1	------	------	------	------	------	------	------	------	3
Northampton,	------	1	------	------	------	------	------	------	1	1	1	4
Northumberland,	------	22	10	------	------	------	------	1	1	1	------	35
Perry,	------	1	------	------	------	1	------	------	2	7	1	12
Philadelphia,	------	------	------	------	------	------	------	------	------	------	------	------
Pike,	------	3	6	4	------	------	------	------	------	------	------	13
Potter,	------	19	11	7	------	1	------	------	------	------	------	38
Schuylkill,	------	49	24	6	------	------	------	------	8	8	1	91
Snyder,	------	3	1	------	------	------	------	------	------	------	------	4
Somerset,	------	70	32	11	------	------	------	------	4	1	------	118
Sullivan,	------	16	10	2	1	------	------	------	1	------	------	30
Susquehanna,	------	2	6	1	------	------	------	------	1	------	------	10
Tioga,	------	11	10	7	1	4	------	------	2	------	------	35
Union,	------	2	------	1	------	1	------	------	------	2	------	6
Venango,	------	4	1	1	------	------	------	------	------	------	------	6
Warren,	------	6	3	2	------	------	------	------	------	------	------	11
Washington,	------	------	------	------	------	------	------	------	------	------	------	------
Wayne,	------	15	9	1	1	------	------	------	------	------	------	26
Westmoreland,	1	19	20	6	------	------	------	------	------	4	1	51
Wyoming,	------	2	5	2	------	------	------	------	1	------	------	10
York,	------	4	------	2	------	------	------	------	1	1	------	8
Totals,	2	692	410	255	8	26	10	2	88	102	30	1,625

The total number of fires reported for 1918 was 1,625. It must be remembered, however, that we are still not getting complete reports, especially of small fires. Where our protective organization is most complete and efficient we probably get close to 100% of all fires, but in certain other parts of the State, we may fail to get as high as 25% of the total number of fires. Because they are extinguished before they burn over an acre, there is little or no expense incurred and individuals and wardens do not report them. In one county, several hundred-acre fires occurred but we got no formal reports of them and nothing definite enough to incorporate into our tables.

In 1918 the greatest number of fires occurred during March, namely 692. April had 410, May 255, November 102, and October 88. It is unusual to have so many fires during March. Notwithstanding the heavy snows of last winter they melted early and the high winds of the early part of the month together with unusual high temperature dried the vegetable cover of the soil, producing a favorable condition for fires before people expected them. Few precautions had been taken. Railroad rights-of-way had not yet been cleaned. Stimulated agricultural interests accounted for the cleaning of waste land unused for some time and of new land. Inexperienced people undertook to do this kind of work. There was little help to be expected at the time the burning was done. Of the fires in March, railroads were responsible for 274, and probably a large percentage of the 231 fires reported as of unknown origin were set by railroad engines. Brush burners were responsible for 59, incendiaries for 40, and miscellaneous causes for 76.

Brush burning and land clearing in spring are always great sources of fires. The total number of fires from this cause reported during the year was 115. Needless to state these fires are all the result of carelessness. The burning is needlessly done, improperly done, or insufficiently guarded. The proportion of incendiary fires of this year, in number 118, was not higher than usual. There did seem to be an unusual number, however, started by boys playing with matches and bon-fires. Railroads were responsible for the usual percentage, the total for the year being 492. They are responsible for the greatest number of known causes, but if the fires of unknown origin could be rightly distributed the chances are that the number set for brush burning and by campers including smokers, fishermen, and hunters, would run a close second and third.

COMPARISON BY MONTHS

	January.	February.	March.	April.	May	June	July.	August.	September.	October.	November.	December.	Total.
1915,	------	3	84	739	94	18	1	------	------	84	119	9	1,101
1916,	4	------	9	181	307	5	2	23	30	127	220	115	1,013
1917,	2	6	143	897	688	8	1	4	8	13	313	4	2,087
1918,	------	2	[illegible]	410	255	8	28	10	2	88	102	80	1,625

COMPARISON BY CAUSES

	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.	Total.
1915,	274	105	120	136	28	19	37	382	1,101
1916,	270	55	95	182	44	10	45	312	1,013
1917,	756	173	127	200	45	3	52	731	2,087
1918,	492	115	118	99	46	6	162	587	1,625

COMPARISON BY ACREAGE

	Less than 1 Acre.		1 to 100 Acres.		100 to 1,000 Acres.		More than 1,000 Acres.		Total.	
	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.	Number.	Acres.
1915.	61	31.	639	20,637	823	115,116	78	200,851	1,101	336,685
1916.	103	25.	662	14,209	220	60,568	28	79,890	1,013	154,752
1917.	237	57.87	1,264	27,532	521	149,482	66	141,228	2,087	319,339
1918.	205	30.	1,000	20,982	363	92,396	57	114,077	1,625	227,485

It is interesting to note the figures shown by a classification of fires according to acreage burned over. Two hundred and five were less than an acre each in extent and burned a total of only 30 acres. One thousand fires burned from one to one hundred acres each, and a total of about 21,000 acres. Three hundred and sixty-three burned from 100 to 1,000 acres each, and a total of 92,400 acres. Fifty-seven burned over 1,000 acres each and 114,000 in total. It will be observed that three-fourths of the total number covered less than one-tenth of the total area burned by all fires, viz., 227,485 acres. The thousand-acre fires, as usual, burned half the total area. The figures prove, as in past years, the value of prompt detection and prompt attack.

It is difficult to report the percentage of the total forest area of the State which has been burned over, either in the past or in 1918. On a basis of 10,000,000 acres subject to fire, the 1918 loss represents 2¼%. But this means nothing because no one knows the exact forest area of the State and still less the area subject to recurrent fires. The State Forests, land owned by the State, are in locations where they are subject to fires by transients and incendiaries, and are in the majority of townships where it is difficult to get men quickly to a fire when it occurs. Notwithstanding the handicaps and extra hazards, the area of State Forest burned in 1918 was only 16,600 acres or about 1.6% of the total area now owned. Most of this loss occurred within five counties.

STATE FOREST BURNED

County.	Total Area State Forest December 31, 1918.	Area Burned. 1915.	1916.	1917.	1918.
	Acres.	Acres.	Acres.	Acres.	Acres.
Adams,	20,857	1,540	134	1,653	164.20
Bedford,	10,570	125	160	—	12
Cameron,	82,113	1,410	6,085	507	798
Centre,	79,888	2,408	5,184.2	227.5	1,413
Clearfield,	48,606	25	3.2	140	—
Clinton,	132,796	13,275	472.5	1,070.3	4,199
Cumberland,	21,527	5,550	892.5	985	200
Dauphin,	3,808	2,000	—	105	60
Elk,	14,840	135	100	200	—
Franklin,	34,627	502	604.6	3,293.6	62.71
Fulton,	6,300	—	—	—	—
Huntingdon,	57,317	17	5,473.3	206	6.75
Juniata,	3,179	—	327.7	—	40
Lackawanna,	4,956	—	800	150	—
Lycoming,	95,140	2,704	1,780.1	3.900	3,124
Mifflin,	50,383	137	1,597.1	640.5	509
Monroe,	6,400	—	—	50	60
Perry,	28,149	2,150	—	800	60
Pike,	58,109	6,155	394	335	2,700
Potter,	130,292	365	180.8	160	2,909
Snyder,	19,087	2,825	1,615	—	—
Somerset,	3,467	78	—	—	—
Tioga,	60,375	105	1,178	66	275
Westmoreland,	5,065	70	—	—	2
Union,	53,675	387	786	3	5.50
Wyoming,	1,177	—	—	—	—
Total,	1,082,233	41,968	27,718	14,441.9	16,600.16

SUMMARY OF 1918 FIRES BY CAUSES

Cause.	Number of Fires.	Area Burned.	Damage.	Cost of Extinction.
Railroads,	492	58,565.10	$120,072 75	$4,491 10
Brush burning,	115	17,420.50	43,960 40	2,242 55
Incendiary,	118	29,816.82	47,380 00	2,945 32
Campers,	90	12,416.01	25,727 00	1,929 67
Lumbering,	46	5,010.75	23,358 25	1,331 81
Lightning,	6	435.25	406 50	121 98
Miscellaneous,	162	21,745.92	37,746 50	2,774 52
Unknown,	587	82,074.62	111,986 00	9,538 38
Total,	1,625	227,484.97	$410,637 40	$25,374 83

The amount of direct damage reported by our wardens was $410,637.40. Considering the facts that this does not include reports of all fires, that many reports had no damage indicated, especially by large fires, and that the wardens seldom if ever reported loss to property, other than that to the forest, we are within safe limits to say that the direct loss was at least twice the amount or something between $800,000.00 and $1,000,000.00. The indirect loss to our citizens can never be calculated nor agreed upon, but when we consider loss of production, labor, taxes, increased prices for wood and wood products, floods and their consequences, droughts and their consequences, loss to soil, transportation, agriculture, game and fish, recreation, and other things, $50,000,000.00 does not seem an excessive figure. The reported loss resulting from the fires as classified according to causes is about in the same proportion as the numbers. As for example, the railroads were responsible for about 30% of the total number of fires. The reported loss from railroad fires was 30% of the total.

The average acreage per fire in each of the last four years, was as follows:

1915,	306 acres
1916,	152 acres
1917,	153 acres
1918,	134 acres

This makes a good showing under the conditions which have prevailed, but the average of this spring's fires was 150 acres. This is still a great way off from an average of 10 acres per fire, which is the standard toward which we are striving.

EXTINCTION EXPENSES FOR 1918 FIRES

County.	Labor.	Transportation.	Meals.	Telephone.	Affidavit.	Tools.	Postage.
Adams,	$62 70	$15 76					
Allegheny,							
Armstrong,	117 45						
Beaver,							
Bedford,	660 05	25 37	$10 50	$0 10			$0 96
Berks,	83 42	2 75					
Blair,	589 40	39 32	2 00				06
Bradford,	39 15	5 50					
Bucks,	68 55	6 00					
Butler,	28 20						
Cambria,	3,066 05	149 50	51 37			$5 98	63
Cameron,	297 65	4 70	14 09				
Carbon,	279 21	29 90	10 34				30
Centre,	1,801 47	212 13	67 30	25	$0 75	16	1 48
Chester,	41 55	7 00			25	4 00	
Clarion,	13 40						
Clearfield,	647 50	36 00	4 25				
Clinton,	792 20	55 40	70 96	20		5 70	
Columbia,	328 53	9 25		25			1 49
Crawford,							
Cumberland,	151 78	96		20			60
Dauphin,	305 50	14 25	1 75		25		
Delaware,							
Elk,	262 00	28 10	2 62				26
Erie,							
Fayette,	1,137 35	42 84	6 00				5 71
Forest,	70 20						
Franklin,	405 28	56 20	6 42	20		05	
Fulton,	161 63	2 50					
Greene,							
Huntingdon,	796 25	60 86	24 48			2 50	54
Indiana,	1,015 80	31 50	8 83			4 91	2 41
Jefferson,	49 80						
Juniata,	109 55	5 62	1 41	1 10			
Lackawanna,	229 65	5 50					
Lancaster,	74 50						
Lawrence,							
Lebanon,	33 75	1 50					56
Lehigh,	30 14					3 00	
Luzerne,	1,118 10	14 20	7 30	10		2 00	1 02
Lycoming,	1,721 60	144 00	81 07	45		7 50	
McKean,	211 00	41 50	4 40			1 80	
Mercer,							
Mifflin,	495 70	13 50	8 53	1 00			
Monroe,	536 20	146 75	3 81			7 60	2 22
Montgomery,							
Montour,	39 06	6 00					
Northampton,	27 90	1 00					
Northumberland,	239 25	11 40					
Perry,	97 75	1 25					
Philadelphia,							
Pike,	451 20	50 45	34 40				
Potter,	954 76	99 50	15 75				
Schuylkill,	562 41	20 30	4 05	10			
Snyder,	25 40	2 00					
Somerset,	772 15	26 30	15 01				
Sullivan,	347 95	6 00					
Susquehanna,	76 50	4 00					
Tioga,	447 80	50 60	14 71				
Union,	15 30	4 50		35		38	
Venango,	101 13	11 00					
Warren,	70 45	12 30	2 84				
Washington,							
Wayne,	343 40	25 00		20			
Westmoreland,	671 50	18 10	22 59				
Wyoming,	182 50	8 00	1 00				
York,	97 70	4 00				1 00	
Total,	$23,291 37	$1,570 06	$492 78	$4 50	$1 25	$46 58	$15 12

Grand total, $25,424.66 (which includes an expense of $49.33 for 9 false alarms.)

The total cost of extinction for all 1918 fires tabulated to date was $25,374.83, which is about $5,000.00 less than the cost of extinction in 1917. Until we can get to all fires promptly and extinguish them before they reach an extent of 10 acres and until we can reduce the number of fires, the cost of extinction per year may be expected to increase, or at least decrease very little. The wages of 1918 were one third higher than in 1917. Under the efficient plan if the cost of extinction increases and the loss is materially lessened we are still better off.

From a tabulation of the costs of extinction since June 1, 1909, it is plain that for this purpose alone, we cannot do with less than $30,000.00 per year. If an emergency occur, we ought to be in a position to meet our obligations promptly instead of being held up by delays and of having to wait for deficiencies.

As an additional item of the loss which results from forest fires, attention is called to the fact that in the spring of 1918 there were used for fire extinction 98,298 hours man labor for which wages were paid from the appropriation for the bureau of forest protection. During the fall season the extinction of fires required 13,754 hours man labor. This makes over 100,000 hours time spent needlessly. This does not include an almost equal amount of time spent by private individuals of which we have no record. When it is remembered that in the spring of 1918 laborers were difficult to get and all kinds of demands were being made in order to increase production of all kind, we can appreciate the amount of waste of time required to suppress fires which were entirely unnecessary and which could have been prevented by a little foresight and carefulness on the part of those responsible for forest fires.

AREA, DAMAGE, AND COST OF EXTINCTION OF FOREST FIRES IN 1916, 1917, AND 1918.

County.	Number.			Area—Acres.			Damage.			Cost of Extinction.		
	1916.	1917.	1918.	1916.	1917.	1918.	1916.	1917.	1918.	1916.	1917.	1918.
Adams,	9	37	13	526	2,654.37	214.45	$1,606	$5,683	$1,133 00	$107 65	$470 90	$68 46
Allegheny,												
Armstrong,	10	17	25	222	670.50	1,159	917	3,017	3,466 00	58 10	112 65	117 45
Beaver,												
Bedford,	46	62	33	4,996	12,497.75	7,596.90	4,708	18,681	4,105 00	483 16	1,237 53	696 98
Berks,	27	22	13	2,225	1,067 25	521.25	5,112	3,465	665 00	805 71	236 36	86 17
Blair,	41	56	37	17,977	14,077.56	3,898.50	19,743	27,188	5,054 00	636 69	1,184 16	630 78
Bradford,	3	20	10	47	756.50	547	32	4,741	560 00	17 00	157 79	44 65
Bucks,	4	5	10	35	412.01	481	74	333	410 00	20 05	34 01	69 55
Butler,	1	2	8	60	520	990			1,135 00	9 85		28 20
Cambria,	31	66	140	614	5,846.90	17,089	3,233	4,914	35,889 50	139 75	609 64	3,245 65
Cameron,	15	17	21	3,207	1,981	3,823	7,445	2,123	3,733 00	196 55	152 50	316 44
Carbon,	33	52	84	7,466	10,300.25	4,801.46	10,429	22,642	3,160 00	376 73	768 03	319 84
Centre,	47	90	60	9,143	16,586.92	22,889.75	8,161	36,838	26,641 50	1,556 20	1,401 84	2,083 54
Chester,	5	11	7	454	318	275	4,686	7,592	505 00	54 02	60 12	52 80
Clarion,	2	8	3	7	2,257	22.50	26	75	12 50	18 85	188 25	13 40
Clearfield,	14	49	45	3,482	6,472.50	8,711.12	1,071	16,887	14,448 25	177 96	636 50	687 75
Clinton,	56	71	31	6,701	12,885.35	18,117	23,330	14,722	24,842 00	529 40	577 26	924 46
Columbia,	8	34	15	3,248	5,392.75	3,381	17,725	8,144	11,843 50	187 88	371 48	339 52
Crawford,	2	6	1	752	175	45		320	100 00	4 75		
Cumberland,	20	21	19	1,517	3,581.75	1,302	2,019	6,086	2,579 00	180 01	444 60	153 54
Dauphin,	20	75	23	3,604	21,393.83	2,896	6,466	25,473	2,147 75	307 94	1,637 26	321 75
Delaware,		1			55							
Elk,	14	54	34	1,380	18,889.35	3,169	2,792	14,745	2,874 00	581 56	391 92	292 97
Erie,			1			13						
Fayette,	26	47	68	3,908	6,078.75	12,747.62	7,247	13,027	42,541 00	316 10	677 09	1,191 90
Forest,	8	13	15	337	1,267	387.75	25	800	1,113 50	23 30	44 60	70 20
Franklin,	75	89	62	1,526	6,733.11	1,859.53	2,219	7,244	2,956 50	541 90	1,253 10	408 15
Fulton,	18	18	13	1,200	1,433	403.50	2,362	1,538	440 00	276 05	413 80	164 13
Greene,												
Huntingdon,	34	69	47	7,610	7,382.11	8,128.75	10,118	15,762	7,214 00	963 41	709 64	884 63
Indiana,	5	18	23	457	1,424.50	6,090.50	3,400	2,301	13,050 00	81 70	144 26	1,058 45
Jefferson,	2	9	4	16	538.75	245		2,664	740 00	6 88	109 60	49 80
Juniata,	16	31	12	3,692	13,136.50	323	6,061	71,902	550 00	206 76	537 24	117 68
Lackawanna,	12	29	17	3,050	3,417	4,545.50	3,410	3,271	2,398 00	233 68	379 86	235 15
Lancaster,	2	8	5	350	1,604	100	2,525	10,070	975 00	53 81	140 65	74 50
Lawrence,												
Lebanon,	2	11	5	1,100	2,592.25	424	1,200	3,325	600 00	55 35	116 28	35 61
Lehigh,	8	10	4	443	3,532	[illegible]	1,560	11,715	125 00	75 41	337 09	33 14

AREA, DAMAGE, AND COST OF EXTINCTION OF FOREST FIRES IN 1916, 1917, AND 1918—Continued.

County.	Number.			Area—Acres.			Damage.			Cost of Extinction.		
	1916.	1917.	1918.	1916.	1917.	1918.	1916.	1917.	1918.	1916.	1917.	1918.
Luzerne,	49	121	66	15,859	21,537	9,606.50	15,172	35,375	14,596 00	1,020 67	1,461 86	1,142 72
Lycoming,	27	56	39	5,009	21,359.50	15,290.25	10,520	58,919	31,425 00	439 16	2,297 65	1,948 82
McKean,	6	21	26	625	900.50	6,176.50	406	743	37,340 00	58 41	95 41	258 70
Mercer,	1			6								
Mifflin,	18	84	21	2,472	8,158.76	4,162.50	4,294	16,792	4,771 00	356 61	902 09	518 73
Monroe,	42	111	50	1,128	10,066.38	5,951.50	1,394	13,384	12,290 00	174 95	1,162 47	690 58
Montgomery,	2			11								
Montour,			3			235			1,350 00			45 06
Northampton,	1	21	4	1	2,469.75	117		3,420	65 00	2 80	212 37	28 90
Northumberland,	13	58	35	656	13,720.51	4,083	578	24,200	2,630 00	79 55	640 17	250 65
Perry,	15	34	12	290	4,338.61	327	1,238	7,352	252 50	136 84	1,071 73	99 00
Philadelphia,												
Pike,	16	26	13	2,871	7,407	8,258.50	4,459	5,760	11,369 50	218 52	440 10	529 40
Potter,	30	57	38	13,385	1,509.70	6,559	10.843	3,231	5,582 00	645 69	291 45	1,066 51
Schuylkill,	37	123	91	3,092	18,360.75	3,621.09	8,491	27,655	14,842 75	394 31	1,422 32	586 86
Snyder,	9	8	4	2,205	366.50	8.75	1,455	684	50 00	238 22	115 27	27 40
Somerset,	25	86	118	1,940	9,905.20	6,908.25	4,533	26,910	23,933 15	197 58	1,330 89	813 46
Sullivan,	23	39	30	542	2,555	1,620	286	1,354	381 00	180 36	393 80	353 95
Susquehanna,	1	8	10	25	46.75	776.25		70	900 00	2 95	22 90	80 50
Tioga,	14	33	35	2,547	2,896	3,195.80	903	3,606	7,995 00	203 61	371 43	513 11
Union,	9	19	6	902	3,403.57	16.50	1,408	4,001	30 00	173 81	567 55	20 53
Venango,	3	4	6	806	998	1,852	1,745	6,025	411 00		85 85	112 13
Warren,	7	14	11	155	1,017	1,680.50	310	1,290	2,000 00	57 63	70 43	85 59
Washington,												
Wayne,	10	19	26	955	1,724	2,185	2,585	2,685	5,283 00	115 65	302 08	368 60
Westmoreland,	27	40	51	2,169	3,109.50	6,442.50	2,361	6,983	12,314 50	324 00	357 66	712 19
Wyoming,	9	20	10	702	982	851.50	1,381	1,380	1,835 00	102 15	223 29	141 50
York,	3	8	8	547	84	444	2,232	125	1,490 00	21 68	44 75	102 70
Total,	1,013	2,087	1,625	154,752	319,339	227,484.97	$236,298	$619,182	$410,687 40	$13,918 80	$30,218 99	$25,374 83

SUMMARY BY CAUSE, AREA, DAMAGE, AND COST OF EXTINCTION OF FOREST FIRES, 1918.

County.	Causes.									Area-acres.	Total damage.	Cost of Extinction.	
	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.	Total.			Bureau of Forest Protection Appropriation.	Individuals.
Adams,			10	1				2	13	214.45	$1,133 00	$68 46	$49 03
Allegheny,													
Armstrong,	20	1					3	1	25	1,159	3,466 00	117 45	81 90
Beaver,													
Bedford,	8	2	1	7	1	1	2	16	38	7,596.90	4,105 00	696 98	14 72
Berks,	6	2	2	2				1	13	521.25	665 00	86 17	60
Blair,	7	3	2	1			8	16	37	3,896.50	5,054 00	630 78	142 70
Bradford,	5	1	2			1	1		10	547	560 00	44 65	18 15
Bucks,		3	1				2	4	10	481	410 00	69 55	3 80
Butler,	1			1			2	4	8	990	1,135 00	28 20	
Cambria,	50	7	8	5	1		12	57	140	17,069	35,889 50	3,245 65	365 75
Cameron,	11	2		1			4	3	21	3,823	3,733 00	316 44	161 08
Carbon,	13		5				2	64	84	4,801.46	3,160 00	319 84	142 48
Centre,	16	9	6	5	4		6	14	60	22,889.75	26,641 50	2,083 54	586 61
Chester,	3	1					1	2	7	275	506 00	52 80	
Clarion,	2							1	3	22.50	12 50	18 40	
Clearfield,	11	3	3	5			6	17	45	8,711.12	14,448 25	667 75	107 40
Clinton,	10	3	2	2			4	10	31	18,117	24,842 00	924 46	447 02
Columbia,	3	2	1	1			1	7	15	3,381	11,843 50	339 52	118 60
Crawford,			1						1	45	100 00		16 40
Cumberland,	11		1	1				6	19	1,302	2,579 00	153 54	26 14
Dauphin,	5	1		5	1		1	10	23	2,896.00	2,147 75	321 75	71 20
Delaware,													
Elk,	22	1		1			4	6	34	3,169	2,874 00	292 97	47 55
Erie,								1	1	13			6 00
Fayette,	21	5	7	8	2		6	19	68	12,737.62	42,541 00	1,191 90	156 20
Forest,	11		1				2	1	15	887.75	1,118 50	70 20	6 70
Franklin,	5	5	32	7			3	10	62	1,859.58	2,956 50	468 15	153 47
Fulton,		1	1	8			2	6	18	403.50	440 00	164 13	16 08

SUMMARY BY CAUSE AREA, DAMAGE, AND COST OF EXTINCTION OF FOREST FIRES, 1918.—Continued.

County.	Causes.									Area—acres.	Total damage.	Cost of Extinction.	
	Railroads.	Brush burning.	Incendiary.	Campers.	Lumbering.	Lightning.	Miscellaneous.	Unknown.	Total.			Bureau of Forest Protection Appropriation.	Individuals.
Greene,													
Huntingdon,	12	5	3	5	1	2	4	15	47	8,128.75	7,214 00	884 63	97 28
Indiana,	8	2	3		1		2	12	28	6,000.50	13,050 00	1,058 45	216 60
Jefferson,	2							2	4	245	740 00	49 80	
Juniata,				1	5		2	4	12	323	550 00	117 08	17 40
Lackawanna,	8	1		1	1		1	5	17	4,545.50	2,398 00	235 15	87 90
Lancaster,			1	1				3	5	100	975 00	74 50	8 00
Lawrence,													
Lebanon,				2			1	2	5	424	600 00	35 61	
Lehigh,		1	1				1	1	4	68	125 00	33 14	1 00
Luzerne,	11	5	1	3	1		8	37	66	9,606.50	14,595 00	1,142 72	63 60
Lycoming,	6	8	4	8			10	8	39	15,290.25	31,425 00	1,948 82	130 76
McKean,	8	2			1		7	7	25	6,176.50	37,340 00	258 70	99 05
Mercer,													
Mifflin,	1	1		4	1	1	2	11	21	4,162.50	4,771 00	518 73	24 00
Monroe,	20	8	1	2	1		3	15	50	5,951.50	12,290 00	690 58	118 90
Montgomery,													
Montour,	2	1							3	235	1,850 00	45 06	2 60
Northampton,				1				3	4	117	65 00	28 90	
Northumberland,	7	2	4				6	16	35	4,083	2,630 00	250 65	188 47
Perry,				3	1			8	12	327	252 50	99 00	19 33
Philadelphia,													
Pike,	1	2	1	3			1	5	13	8,258.50	11,369 50	529 40	80 80
Potter,	11	9	3	1	2		2	10	38	6,559	5,582 00	1,066 51	183 01
Schuylkill,	22		2	1			4	62	91	8,621.09	14,842 75	586 86	134 64
Snyder,	3							1	4	8.75	50 00	27 40	14 00
Somerset,	71	2	4	1	12		16	12	118	6,908.25	23,933 15	813 46	234 95
Sullivan,	13	1		2			1	13	30	1,620	381 00	353 96	40 60
Susquehanna,	4	1					1	4	10	776.25	900 00	80 50	41 60
Tioga,	7	8	1	2		1	4	12	35	3,195.80	7,995 00	518 11	83 25

Union,	2						2	2	6	16.50	30 00	20 53	6 06
Venango,	3	1					1	1	6	1,852	411 00	112 13	23 50
Warren,	5						2	4	11	1,680.50	2,000 00	85 59	41 10
Washington,													
Wayne,	5	1					3	17	26	2,135	5,288 00	308 60	88 50
Westmoreland,	18	4	2	1	9		4	13	51	6,442.50	12,314 50	712 19	73 30
Wyoming,	5	1		1			1	2	10	851.50	1,335 00	141 50	21 00
York,	1	2	1		1		1	2	8	444	1,490 09	102 70	22 05
Total,	492	115	118	99	46	6	162	587	1,625	227,484.97	$410,637 40	$25,374 88	$4,791 29

OUTSIDE WORK

The following is a brief statement of the activities of the chief forest fire warden outside of Harrisburg. Only a very small part of the outside supervision and investigation was done that should have been done. This work can never be satisfactorily arranged for until our supervisory force is established and until the State provides some means by which its employees are furnished with traveling and expense certificates in such way that the necessary funds need not be furnished by the employees themselves.

Jan. 1. Pittsburgh. Meeting of Society American Foresters.
Jan. 18. Weissport. Attending hearing of Peter Yursick. Case settled.
Feb. 19. Laurelton. Examined planting site on Buffalo Forest.
Feb. 21. Jenkintown. Examing woodlot of Dr. H. M. Fisher.
Mar. 1. Pump Station. Examined planting site on Black Forest.
Mar. 2. Oleona. Examined planting site on Ole Bull Forest.
Mar. 3. Galeton.
Mar. 4. Austin. Examined planting site on Austin Forest.
Mar. 5. Austin to Clearfield. Met Forester Dague.
Mar. 6. Clearfield to Ligonier. Met Forester Bearer.
Mar. 7. Ligonier. Examined planting site on Stuart Forest.
Mar. 23. Buck Hill Falls. Meeting Monroe County Wardens.
Apr. 20. Laurelton. Examined planting camp and operation on Buffalo Forest.
Apr. 25. Kane. Meeting McKean County Protective Fire Association to interest new members.
May 1. Livonia. Examined planting operation on White Deer Forest.
May 6. Dyer Farm. Examined planting camp and operation on Black Forest.
May 7. Oleona. Examined planting camp and operation at Big Spring, Ole Bull Forest.
May 8. Austin. Examined planting camp and operation on Austin Forest.
May 9. Asaph. Examined nursery stock in Department Nursery. Cedar Run, examined planting camp and operation on Blackwells Forest.
May 16. Mt. Gretna. Examined plantings made on State Encampment Grounds.
June 25-29. Pocono Manor. Meeting Pennsylvania Forestry Association.
July 1. Wilkes-Barre. In regard to several fire cases. Visited district attorney.

July 1. Ross township, Luzerne Co. Another fire case.
July 17. Pottsville. Visited district attorney concerning fire case, previously dropped by Grand Jury.
Looked over land of Schuylkill Coal & Iron Co. Pines injured by winter injury and by borers.
July 18. Wilkes-Barre. District attorney in regard to Ross township fire case.
Aug. 5. Fort Loudon. Inspecting C. V. R. R. right-of-way between Fort London and Richmond Furnace.
Aug. 26. Snow Shoe.
Aug. 27. Clearfield. Met Forester Dague and examined his nursery.
Aug. 28. Sigel. Examined land offered to State by Miss Annette Frazier.
Sept. 11. Shickshinny. Investigated origin of fires, and examined Huntingdon Valley Camp Meeting Grove.
Sept. 12. Scranton. Went over lands and some plantations of Scranton Gas and Water Co. Inquiry about condition of D. L. & W. right-of-way, and organization of protective association.
Sept. 17. Hershey. Farm woodlot examination.
Oct. 18. Mt. Gretna. Examined plantations made in fall of 1917.
Oct. 25. Philadelphia. Interviewed gentleman who offered a number of black walnut seedlings to State.
Nov. 15. Devon. Raised 71 five year old black walnut seedlings.
Dec. 2. New York. Conference with Gifford Pinchot.
Dec. 17. York county. Assisted with timber estimate on two woodlots of Mr. Mumma.
Dec. 19. Pittsburgh. Represented Department at Game Dinner.

PUBLICITY.

Publicity measures taken during the year 1918 were not very extensive. Circulars were issued to the fire wardens calling their attention to the posters which we have available and a great many of these have been distributed. The prevention of forest fires as a safety measure was called to the attention of the National Public Safety Committees, in all of our counties. Land owners in various parts of the State were written to in regard to elimination of hazards, especially along railroads.

Notice of forest fire was sent to each individual who was reported by the wardens as having had land burned over.

Letters were written to railroad officials asking for co-operation and for the issuance of special orders relating to forest fires. About 4,800 copies of our 1917 Report were distributed to the people whom we thought might be most interested in knowing of forest fire conditions in Pennsylvania. Several of the foresters had special circulars issued for their own local needs.

The following statement from district forester, R. Lynn Emerick, in charge of the work in Potter and McKean counties is significant:

> "Despite the fact that nearly every one was actively engaged in one or the other of the war activities, the progress made during the past year in actually getting forestry before the people and in obtaining concrete results as to the needs of forestry and forest protection, has been the most successful since the office of district forester was established for this district. The Liberty Loan, War Savings, Y. M. O. A., Red Cross, and similar drives made it possible for the district forester to get in touch with larger audiences and while the 'Winning of the War' was the principal thing yet very often the subject of forestry could be brought in as a patriotic issue and the needs and resourcefulness of the French forests were emphasized. An attempt was made to show what would have happened to France if she had devasted her forests like Potter and McKean counties and how necessary it was for these counties to bring back their forests by proper care and protection while it was yet possible to do so. Apparently it had the desired effect and this was ably augmented by a press notice sent out by the chief forest fire warden calling the attention of the people to the patriotic duty of protecting the forests from fire.
>
> "It has been demonstrated that the purchase of a Ford automobile for the use of the district forester has paid for itself several times in livery hire and more efficient patrol work. Whenever possible each inquirer was made a personal visit at his home or farm which was found to be more effective than writing.
>
> "The steel fire observation tower is now equipped with steps with four landings. It was visited by thousands of people during the summer. On a single Sunday I counted eighteen automobiles lined along the roadside and the space around the tower resembled a picnic. So many people were on different parts of the tower at one time that it was thought advisable to place a sign on the first landing not allowing more than seven people on the tower at one time. Forestry pamphlets and literature were placed in the observation portion so that any who cared might take one of each. A register was started and had over eight hundred names in it when some miscreant destroyed the names. A sign has been purchased and will be erected early this spring calling attention to fire prevention and the care of forests.
>
> "Comparatively few forest fires occurred none of which was of large proportion. As stated in another previous report, it had been demonstrated beyond a doubt that numerous small plantations scattered throughout the district aid in fire prevention. No one wishes to see his plantation burn over, and in several instances the following remark has been made over the telephone—'I believe there is a forest fire near, it seems so smoky. We don't want our little trees to burn.' It is encouraging to note that the people are more concerned about forest fires than formerly and the numerous calls about smoky appearances evidence this fact. The Sunday when the smoke was so very dense over the whole northern part of Pennsylvania due to the great Minnesota fire, the telephone was busy the entire day with people calling up and telling me that it was very smoky and that a forest fire must be near. We had every available man out on duty that day, and were in constant touch with the lumber and wood chemical companies, who also had all of their men out, none of us realizing the cause of the smoke. It was a great relief when a message came from Buffalo about five o'clock in the evening stating the cause of the smoke. I merely state the above to emphasize the fact that the people are alarmed now when they see or smell forest fire smoke and that only a few years ago the common expression was,—'Let it burn, it will make good pasture for somebody.'"

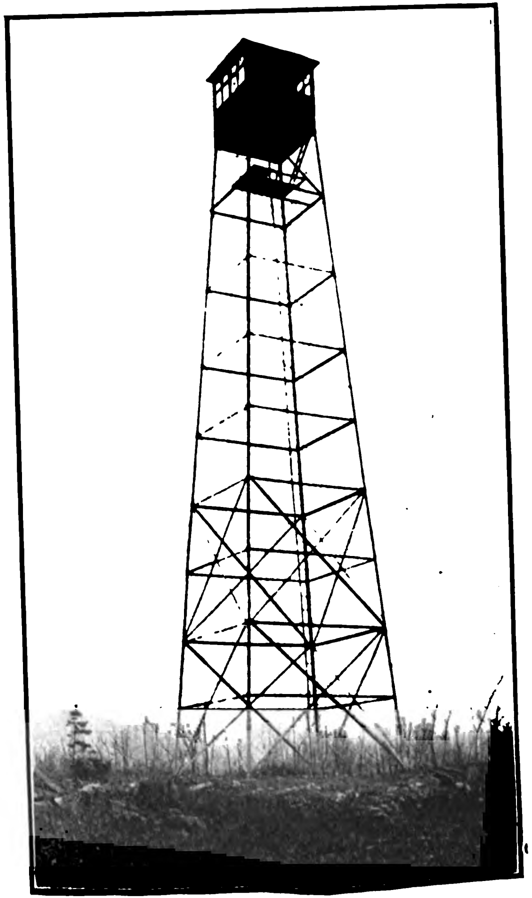
Just before the convening of the Legislature, the subject of forest fires and the necessity of their prevention and control were brought to the attention of the senators and representatives.

The Retail Lumber Dealers Association of Pennsylvania, donated a two-page space in their August directory for us to set forth certain facts relating to forest fires.

We have also made arrangements for publication of forest fire warden lists in ten Bell Telephone directories during 1919.

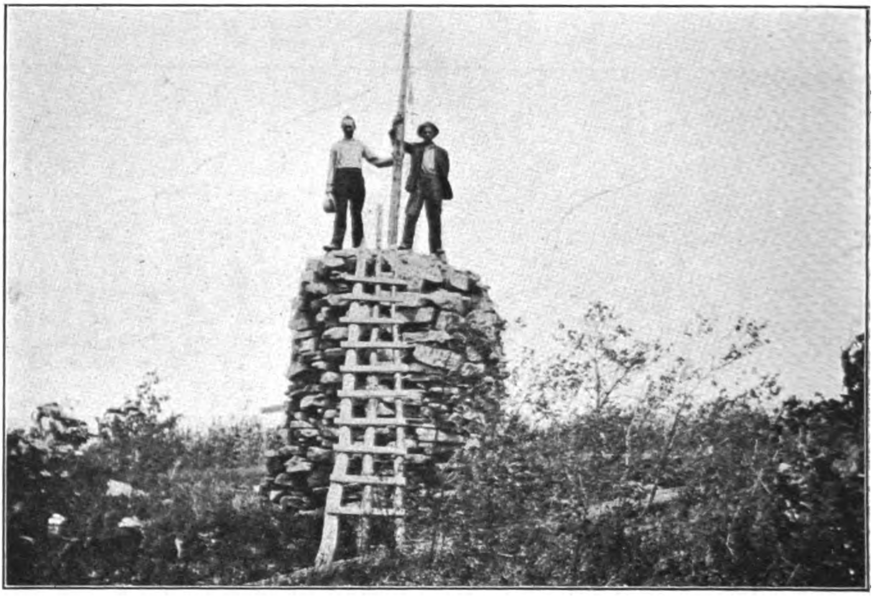
A four-page circular entitled "Can we Afford To Have Forest Fires?" has been printed and about 10,000 distributed. This circular sets forth briefly the various things which forest fires do in Pennsylvania and is a revision of our former circular No. 17.

As a result of the following letter addressed to Governor Brumbaugh, he issued a special proclamation relating to forest fires:

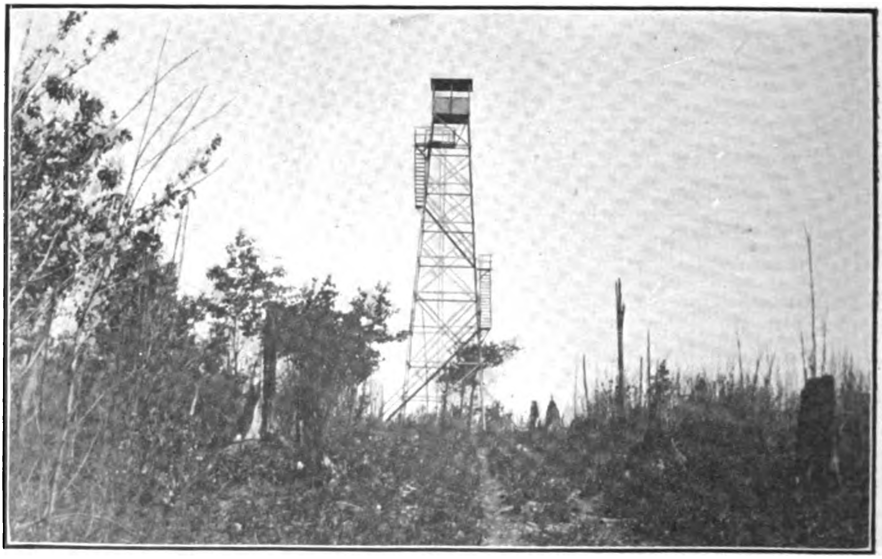


Steel Tower on Sand Mt. White Deer Forest (1917). Sixty feet.

Wooden Tower on Round Top, Buffalo Forest (1918). Forty-five feet.



Stone Tower on Knevil Hill. Lackawanna Forest. (1890. Rebuilt about 1913.) Fifteen feet.



Steel Tower with Steps, Cherry Springs. Ole Bull Forest (1917). Sixty feet.

"November 2nd has been designated as 'Fire Prevention Day in Pennsylvania.' A part of the thought of the day might be devoted to the idea of the prevention of fire in forests as well as the prevention of fire in buildings. Your proclamation and the various posters issued by the State Fire Marshall set forth vividly the loss occasioned each year by burning buildings and the necessity of care and conservation along these lines. It is a startling fact, however, that the people of the State and the Commonwealth are losing more each year from forest fires than from burning buildings. The lowest probable loss from forest fires in Pennsylvania each year must be close to $60,000,000.00. And it should be remembered that buildings can be replaced quickly but forests take years to grow.

"This year, from February to June, forest fires burned over 205,000 acres of land. There were reforested by private individuals and the Commonwealth about 5,000 acres. Tree planting is a good thing, but at this rate it would take forty years to reforest what is destroyed in one spring. It is a losing game.

"There is a fire season on us now. There will be more fires this fall. Hunters are now going into the forests in great numbers. Farmers will burn brush, railroad engines will drop sparks, and other causes will be active. But the need for extreme care at this time is evident for the following reasons:

"First. The fires themselves are calamities.

"Second. The scarcity of man-power means difficulty in getting men to extinguish fires when they occur.

"Third. The high local wages received is another reason for difficulty in getting men to fight fire.

"The State pays only twenty cents per hour for such work. Our fire wardens resign rather than compel men to go with them under such circumstances.

"Fourth. The men who are available are needed at productive labor in agriculture or war industries and taking them away from this labor to fight fire is a misfortune, but the fires must be suppressed.

"Fifth. There is a small amount of money left in our protection fund. With what we know to be the average expense for extinction, we are not likely to have enough to carry us over to June 1, 1919, and we can do practically no preventive work under such conditions. Fire extinction alone cost the Commonwealth this spring almost $22,000.00, and private individuals about the same amount.

"The above facts seem to warrant bringing the subject to the attention of the people by a special proclamation, and I earnestly request that such proclamation be issued at an early date."

PROCLAMATION

WHEREAS, This is the season of forest fires, when irreparable loss may result from carelessness or negligence with reference to fires. The Commonwealth has in its own right more than one million acres of forest lands and the acreage is constantly growing in size and in value. The Commonwealth also has an interest direct and vital in safeguarding the forest lands under private ownership. The safety of human life, our supply of potable water, our protection from floods, our efforts to restore and increase the wild life of the State, the provision for healthy recreation and the increase of the fishes in our streams are all involved in the matter of preventing forest fires. Surely Pennsylvania does not want a repetition of the disasters recently occurring in sister states of the northwest, where many lives and much property were sacrificed to the red-tongued demon.

Therefore, I, Martin G. Brumbaugh, Governor of the Commonwealth of Pennsylvania, holding an abiding interest in the welfare of the people of my native state, resolved to conserve at all times their lives and their property and hoping confidently to have recorded the dawn of a day when Pennsylvania shall again be the land of wonderful woods, glorious in symbolic and utilitarian ministries, vibrant with the sylvan songs of innumerable feathered friends, resonant with the leap of laughing waters and the tread of wild animals, and abundant in grateful shade and wooing welcome, do hereby call upon all our people to co-operate fully and constantly with the State Department of Forestry and other legally constituted agencies in preventing and in speedily suppressing all fires out of doors, especially in proximity to our growing reaches of forest lands. Let all hunters in the pursuit of game avoid the careless use of fire and act always with promptitude in suppressing fires or in giving accurate information against those that violate the laws of this Commonwealth. Let there be among all citizens a quickening love for safety and a resolute purpose to make Pennsylvania forests safe and increasingly beautiful.

Dated November 1st, 1918.

The following articles were prepared and addresses delivered by the chief forest fire warden.

Articles

Jan. 7. Work of Forest Fire Organization. Forest Leaves.

Jan. 29. Forest Protection in Pennsylvania. Canadian Forestry Meeting.

June 14. The Observation Tower in Pennsylvania. Pennsylvania Forestry Association and Forest Leaves.

Aug. 28. On Ounce of Prevention. Forest Leaves and Pennsylvania Grange News.

Addresses

Jan. 24. Began series of ten lectures on Farm Woodlots at Women's School of Horticulture, Ambler. Went to Ambler each Thursday. Last Lecture illustrated.
Feb. 27. Work of Department of Forestry. (Illustrated) Columbia.
Apr. 20. Work of Department of Forestry. (Illustrated) Planting Camp in Buffalo Forest.
May 6. Work of Department of Forestry. (Illustrated) Planting Camp on Black Forest.
May 7. Work of Department of Forestry. (Illustrated) Planting Camp on Ole Bull Forest.
May 8. Work of Department of Forestry. (Illustrated) Planting Camp on Austin Forest.
May 15. Tree Conservation. Women's Club of Middletown.
Oct. 4. Began series of fifteen lectures on Protection of Forests from Fire, at State Forest Academy. Two each Tuesday.

CO-OPERATION

The following statements from three Protective Associations show that the Association idea at least has not gone backward. Unfortunately, however, no one has taken the place of the Secretary of the Central Protective Association and practically nothing has been done in northern Centre county as far as that Association is concerned.

Requests have come to us within the year for the organization of two additional forest protective associations. It is to be hoped that the year 1919 will see not only a revival of the activities of the Central Protective Association, but also the beginnings of two or three new ones.

POCONO PROTECTIVE FIRE ASSOCIATION

Report for year ending Dec. 31, 1918

RECEIPTS:		
Balance on hand, January 1st, 1918,	$407 16	
Assessments for previous years (arrears),	———	
Assessments for current year,	586 48	
Contributions in cash (directly or indirectly),	319 00	
Refunds from State,	559 75	
Interest on deposits,	4 17	
Value of contributions in labor or material,	———	$1,876 56

DISBURSEMENTS:		
Printing and stationery,	53 61	
Postage,	27 69	
Secretary-treasurer allowance,	67 85	
Travel, telephone and telegraph charges,	-------	
Rewards for essays, etc.,	-------	
Towers and telephones,	60 41	
Tools and equipment,	45	
Patrolmen and observers,	1,230 85	
Office rent,	-------	
Other outlay not itemized,	45 97	
Rewards for convictions,	-------	$1,486 83
Balance on hand, December 31, 1918,	-------	$340 73
ASSETS:		
Cash on hand,	$340 73	
Unpaid assessments for current year,	30 67	
Unpaid assessments for previous years,	-------	
Towers and telephone lines,	150 00	
Tools and equipment,	25 00	
Supplies,	-------	
Refunds from State (due),	285 58	$831 98
LIABILITIES:		
Outstanding bills for year's expenses,		-------
Area of forested land within protected region, acres,		140,000
Area belonging to members upon which assessment is based, acres,		31,000
Rate of assessment per acre,		.01
Number of members January 1st, 1918,		207
Number of new members added during year, 1918,		12
Number of members on roll December 31, 1918,		219

McKEAN COUNTY PROTECTIVE FIRE ASSOCIATION

Report for Year Ending Dec. 31, 1918.

RECEIPTS:		
Balance on hand, January 1st, 1917,	$499 18	
Assessments for previous years (arrears),	1 37	
Assessments for current year,	542 77	
Contributions in cash (directly or indirectly),	100 00	
Refunds from State,	101 07	
Value of contributions in labor or material,	-------	$1,244 39
DISBURSEMENTS:		
Printing and stationery,	47 00	
Postage,	8 00	
Secretary-treasurer allowance,	120 00	
Travel, telephone and telegraph charges,	8 20	
Rewards for essays, etc. (service),	160 00	
Towers and telephones,	-------	
Tools and equipment,	-------	
Patrolmen and observers,	37 40	
Office rent,	-------	
Other outlay not itemized—Clerical service and affidavits,	13 00	
Rewards for convictions,	-------	$393 60
Balance on hand December 31, 1918,	-------	$850 79
ASSETS:		
Cash on hand,	$850 79	
Unpaid assessments for current year,	-------	
Unpaid assessments for previous year,	-------	
Towers and telephone lines,	-------	
Tools and equipment,	-------	
Supplies,	-------	
Refunds from State (due),	13 88	
		$864 67
LIABILITIES:		
Outstanding bills for year's expenses,	-------	
Area of forested land within protected region, acres,		59,464
Area belonging to members upon which assessment is based, acres,		59,464
Rate of assessment per acre,		.01
Number of members January 1st, 1918,		36
Number of new members added during year 1918,		8
Number of members on roll December 31, 1918,		44

The above does not include acreage of South Penn Oil Co., which company made a donation of $100.00 but will not become a member.

ANTHRACITE FOREST PROTECTIVE ASSOCIATION

Report for year ending Dec. 31, 1918

RECEIPTS:		
Balance on hand, January 1, 1918,	$1,302 45	
Assessments for previous years (arrears),	290 85	

Dues for previous years (arrears),	1 00	
Assessments for current year,	1,643 66	
Dues for current year,	1 00	
Refunds from fires,	726 58	
Refunds from State,	968 25	
Advance payment of dues,	2 00	
Contributions in labor or material (interest),	11 02	
		$5,006 81
DISBURSEMENTS:		
Printing and stationery,	20 00	
Postage,	4 57	
Secretary-treasurer allowance,	150 00	
Travel, telephone and telegraph,	74 70	
Towers and telephones,	1,460 60	
Fire wardens and fire extinction,	39 84	
Other outlay not itemized,	4 45	
Fire extinction,	814 65	$2,568 81
		$2,438 00
Less amount due, Ex. Secretary-treasurer,		3 91
Balance on hand December 31, 1918,		$2,434 09
ASSETS:		
Cash on hand,	$2,434 09	
Duplicated expenditure of ex-Treasurer,	3 91	
Unpaid assessments for previous years,	98 90	
Towers and telephone lines,	1,460 60	
Unpaid dues for current year,	4 00	
Unpaid dues for year 1917,	1 00	
Refunds from State (due),	18 83	
		$4,021 33
Area of forested land within protected region, acres,		500,000
Area belonging to members upon which assessment is based, acres,		70,053
Rate of assessment per acre,		.02
Number of members, January 1, 1918,		14
Number of new members added during year 1918,		2
Number of members on roll December 31, 1918,		16

Rural Mail Carriers.

Attention is called to the order of the Postmaster General, published in the supplement to the Official Postal Guide of June 1918. This order has been repeated each year since the first issuance and we are glad to report that in Pennsylvania the rural mail carriers have reported a number of fires to our wardens.

"The attention of postmasters and rural and star route carriers is directed to the following order, which should be carefully observed:

ORDER No. 9006 July 12, 1915.

"The following instructions are promulgated for the guidance of the postal employes concerned.

"In accordance with the request of the Secretary of Agriculture this Department has arranged a plan of co-operation with the State and National forest officers whereby rural and star route carriers shall report forest fires discovered by them along their routes to persons designated by the State and National authorities to receive such intelligence.

"Co-operation with State officers will be given in all States which have established by law a system of forest fire protection.

"Co-operation will be furnished National Forest officers in all States containing National forests.

"The State and National authorities will inform postmasters as to whom the discovery of fires should be reported, and each rural carrier should be directed to co-operate to the fullest extent with such authorities in the manner agreed upon, namely, that the carrier shall report a fire to the nearest State fire warden or National Forest officer on his route, or, if no such warden or officer lives on the route, to arrange through some responsible citizen to have him notified, by telephone if possible. Star route contractors and carriers are included in the plan of co-operation and should be requested to report the discovery of fires in the same manner as will be done by the rural carriers.

"Postmasters in or near National Forests are also directed to report fires to the nearest forest officer."

Railroads.

While we are still unable to state that the railroads operating in Pennsylvania have done all that they could do to co-operate with us yet the fact remains that we have had more co-operation this year than in any previous year. We had a conference with the Manager of one of our smaller roads in the office of the Attorney General.

We have had inquiries from various officials in regard to the establishment of safety strips and patrol service. Representatives of the claim agents of several of the railroad companies have called at our office in order to get acquainted with our work and in regard to particular fires. As will be noted in the table of claims collected, a number of railroad companies have settled our claims not only for the cost of extinction, but for damage to State Forest. It is difficult to understand, however, just how these settlements are made. There seems to be no uniformity as to method or inclination to make settlement. It seems to be left to the individual opinions of certain inspectors, claim agents, or attorneys. In certain cases, claims will be settled for fires in regard to which the evidence which we have could be disputed easily. While in other cases where our evidence is substantial, the claims have been refused, and especially with the fires which have damaged State Forests. In a number of cases claims have been referred to the Federal Administrator with little or no better results than from the individual claim agent.

In one instance the railroad company paid the bill for the establishment of a plowed strip at a dangerous point along the right-of-way, the work being done by one of our forest fire wardens under the direction of a district forester. In other cases safety strips have been burned in co-operation with our foresters or with individual land owners. In still other cases, patrolmen have been provided, but unfortunately this form of co-operation has not been extended as largely as it should be.

Late in the summer an effort was made to have the U. S. Railroad Administrator issue orders to all roads within the State, looking to the prevention of fires along the rights-of-way. Correspondence was had with all of the foresters of the Eastern States, asking for their co-operation. This correspondence was taken up with the U. S. Forest Service, the officials of which attempted to co-ordinate the suggestions made by the various foresters and drew up certain suggestions to be submitted to the Director General as minimum requirements for all railroads all over the United States. These suggestions were still under consideration at the end of the year.

LEGAL AFFAIRS

As in the past two years we have continued to meet during 1918 apparent indifferences on the part of the State's prosecutors in forest fire cases. There were presented to the district attorneys of various counties, several cases which we believed had considerable merit. However, no action would be taken and the only thing we could do was to drop the matter. In several cases, notwithstanding the fact that the attorneys believed that we had no evidence to prove responsibility for the fires, we were able to obtain settlement of our claims for the cost of extinction from the parties responsible, without the assistance of any attorney.

The following statements set forth in brief, facts concerning cases in which some legal action was taken.

BLAIR COUNTY.

Commonwealth v. David Feathers for fire of April 19, 1917.

Mr. Feathers permitted a brush fire to escape from him and do damage to his neighbors. Bill for cost of extinction was presented to him, but we could get no reply. Claim was placed in the hands of an alderman, J. C. Gorsuch of Altoona, for collection. In December, civil suit was instituted and after a hearing was held, the alderman decided that there was no evidence on which to hold Mr. Feathers, but an agreement was made by reason of which Mr. Feathers paid $5.00 covering cost of extinction and costs of prosecution. Neither the alderman nor our district forester believed that Mr. Feathers was responsible for the fire. Mr. Feathers is unable to read and write and is extremely poor. We have directed that the $5.00 be returned to him.

Commonwealth v. Dahlstrom Lumber Company for fire of May 15-18, 1917.

Fire was started by spark from sawmill engine and upon presentation of claim for cost of extinction, officials of the company denied responsibility. Claim was placed in the hands of J. C. Gorsuch of Altoona. After a reasonable length of time, civil suit was started and hearing was scheduled for December 28, 1918. No representative of the company appeared at the hearing. Judgment was awarded for the amount of our claim, $69.15 and costs of suit were placed upon the lumber company.

Commonwealth v. Andrew Slagle for fire of April 27, 1917.

Fire escaped from burning brush piles. Mr. Slagle would not pay the claim for cost of extinction, $4.00, and it was placed in the hands of an alderman for collection. In December 1918, civil suit was instituted but up until December 31, 1918, summons in the case had not yet been served.

Commonwealth v. James Nelson for fire of April 18, 1917.

Fire escaped from burning brush piles. Claim for cost of extinction, $4.95, was presented and no settlement made. Claim finally placed in the hands of an alderman. Mr. Nelson still failed to make settlement, and civil suit was started for collection of the amount. Mr. Nelson was summoned to appear before Alderman Gorsuch of Altoona on December 21, 1918. Neither he nor his representative made an appearance. The alderman awarded us judgment for the amount of claim and costs of suit.

BUCKS COUNTY.

Commonwealth v. Palmer & Kappes for fire of April 7, 1918.

William Palmer, aged 17, and John Kappes, aged 19, were driving through woodlands and threw matches into the dry leaves along the highway. Case was investigated by game warden, Warren Fretz, and with his assistance, Corp. W. G. Stillwell arrested the two young men. Before the justice of the peace, A. K. Hess, both plead guilty and were placed under $300.00 bail for their appearance at Court. At the December term of Court, they were sentenced to pay a fine of $25.00 each, and the costs of prosecution. The indictment was made in accordance with the Act of 1911. It is well to note here the interest taken and assistance rendered by the district attorney, H. H. Keller.

BUTLER COUNTY.

Commonwealth v. E. S. Martin for fire of April 27, 1918.

Mr. Martin was taken in the act of causing fire in woodlands and arrested by a member of Troop "D," State Police. He was released upon payment of fine of $10.00 together with costs.

CAMBRIA COUNTY.

Commonwealth v. Juvenile for fire of March 21, 1918.

A boy was seen to have started woodland fire in North Taylor township, and a warrant for him was sworn out by warden Weller of Johnstown. At the hearing before probation officer, Dr. Bertha Caldwell, on May 3rd, the defendant was excused because he was able to prove that he attended school on March 21st. Witnesses were mistaken in their identity of the boy whom they reported as being responsible for the fire.

CARBON COUNTY.

Commonwealth v. Peter Yursick for fire of May 16, 1917.

Fire escaped from brush which was being burned on a very dry day and with a high wind blowing. Neighbors extinguished fire and no claim was made to the Commonwealth on account of cost of extinction. The case was investigated by District Forester McNeal, who referred the evidence to the district attorney of Carbon county. Mr. Yursick was arrested. He at once admitted responsibility for the fire and desired to settle. January 18, 1918, chief forest fire warden met Mr. Yursick in office of justice of the peace Elmer Boyer, Weisport. Mr. Yursick agreed to satisfy the owners of the land burned over. On this condition case was settled by his paying cost of suit to date, amounting to $12.20.

CENTRE COUNTY.

May 17, 1917 a special train was hauled over the B. C. R. R. from Bellefonte to State College. The day was windy and everything on the ground was extremely dry. In crossing what is known as the Barrens a number of sparks were thrown out and a forest fire resulted, which burned over about 1,500 acres. A number of witnesses saw the beginning of the large fire and several men saw numerous smaller fires arise as the train proceeded on its way.

Previous to this the management of the Bellefonte Central Railroad promised to keep the right-of-way clean, also a safety strip of from 100 to 150 feet outside of the right-of-way. It was claimed that neither of these promises was kept in the spring of 1917. Upon these grounds the district attorney of Centre county was asked to start criminal action against the railroad company. After appealing to him three different times, no results could be obtained. An appeal was made to the Attorney General who advised against any action. An effort was then made to have a conference with the railroad officials and members of the Department of Forestry, in order to have an understanding in regard to the matter. A conference was finally held on the 13th of February 1918. At that time the General Superintendent of the Railroad Company presented testimony to the effect that his employees had done the best they could towards cleaning the right-of-way, also the safety strip and the fire had arisen at a point where recent slashings had been left within 75 feet of the roadbed. Also, that he had been endeavoring to do everything he possibly could in the past, in order to prevent forest fires. As a result of this testimony and upon promise of additional improvements in the way of spark arresters, the Attorney General agreed to drop all action.

It was brought out at the conference that the adjoining land owners did not co-operate satisfactorily in the protection measures and that something should be done to induce them to do their share of this work.

Commonwealth v. Benzie & Bonsok for fire of March 24th-26th, 1918.

These men who are Austrians were seen by a woman to be starting fires in Benner township. The woman telephoned to the sheriff of Centre county who in turn notified Forester Barnes, and asked for assistance in the extinction of the fire. The sheriff obtained evidence against the men, arrested them, and took them to jail. They were each bound over for Court under $600.00 bail, and in the May session of Court Benzie plead guilty. Sentence was suspended on condition that he pay all costs and expenses. Through the prothonotary the State received $90.65, which covered costs of extinction. Bonsok stood trial and was acquitted. County paid costs in this case.

CLEARFIELD COUNTY.

Commonwealth v. Three Juveniles for fire of March 31, 1918.

Three boys were reported to have been setting fires in the woods of Lawrence township. The matter was referred to the district attorney of the county and probation officer by District Forester Dague. County officers refused to do anything until the fire warden had the boys arrested. On May 8th, the fire warden was ordered to have warrant sworn out. For some reason or other this warrant was never issued and on July 12th, District Forester Dague, reported that sufficient evidence could not be produced to connect any of the boys with the fire and that nothing could be done at any rate. Case was dropped.

CLARION COUNTY.

Ashbaugh v. N. Y. Central R. R. Co.

The above was a civil suit arising out of fire of April 29, 1915. Mr. Ashbaugh started civil suit against the Railroad Company and was awarded $800.00, for damage done to 26 acres burned over.

CUMBERLAND COUNTY.

Claim against Phila. & Reading Ry. Co. for fire of May 6-7, 1916.

Fire from sparks thrown out by railroad engine burned over 557 acres belonging to the Commonwealth, and, in addition, almost an equal amount of private land. Claim of $950.00 covering damage and cost of extinction was presented to the railroad company for which no settlement could be obtained. In order to make sure of the reasonableness of our claim, careful examination was made of the land burned over by the chief forest fire warden and his clerk in August 1916.

In the early part of 1918 this claim was presented to the Attorney General for his attention. As far as we are aware his Department did nothing. However, we kept after the railroad claim agent and finally on the 30th day of December, we received a check covering, not only our claim for this fire, but, also, a claim of $125.00 damage to State Forest resulting from a fire in 1914. It will be observed, of course, that no legal action was taken in this case. It is simply included here because of the fact that the matter was referred to the Attorney General for legal action.

CLINTON COUNTY.

Commonwealth v. ——— and ———

In the spring of 1916 two fishermen were seen by two other men to have started a fire on State Forest. The latter were asked to assist in the identification of the men responsible for the fire but failed to do so. The matter was presented to the district attorney and the county detective made some investigation. Everything hinged upon the identification of the men. We were unable to complete this identification, consequently the case had to be dropped and was finally dismissed March 13, 1918.

ELK COUNTY.

Commonwealth vs. P. R. R. Company.

In April 1915, an engine belonging to the Pennsylvania Railroad Company was responsible for a forest fire which burned over 195 acres of State Forest in Benezette township. Claim was immediately presented to the railroad company in the sum of $494.95. The railroad company sent their own foresters to survey this land and to investigate the damage done. They reported that according to their estimate the State had suffered a loss of only $175.84. The Department of Forestry refused to settle upon this basis and the matter was referred to the Attorney General, February 14, 1917, who began suit in the Dauphin county court. An effort was made to settle the case amicably but the forester for the Pennsylvania Railroad Company and the chief forest fire warden were unable to agree upon all matters on which claims for damages should be based, the principal difficulty being the rate of interest which was to be used in the calculations; the railroad forester contending that 5 per cent. should be used. As an actual fact, the loss suffered by the Commonwealth was nearer $850.00 than $500.00.

The matter was again referred to the Attorney General and finally an agreement was reached whereby the railroad company agreed to settle the case by paying the Department $350.00, check for which amount was received on January 17, 1918, and endorsed to the State Treasurer.

FAYETTE COUNTY.

Claim against Ross Wirsing for fire of March 30, 1918.

Claim of $10.30 for cost of extinction was presented but Mr. Wirsing questioned the time of the warden and refused to settle. Warden was instructed to place claim in hands of justice of the peace and to make further investigations. These investigations cost the Commonwealth $10.00. District Forester Bearer finally obtained $15.30 from Wirsing. $10.00 of this was paid directly to the fire warden and $5.30 deposited with the State Treasurer.

Commonwealth v. Clyde Cooley and Russel Humbert for fire of April 27-28, 1918.

These two young men were reported to have deliberately started this fire. The matter was presented to the district attorney. In May term of court both forfeited bail for appearance at court on other charges. Because of the unreliability of our chief witnesses and the inability of the constable to locate the defendants, the case was dropped.

Commonwealth v. Walter Carr & John McLean for fire of Nov. 8, 1918.

These two young men were seen to have deliberately set fire to brush piles on land not belonging to themselves and without any instructions to do so, with the result that several forest fires were started. On December 16th instructions were issued to start suit against these two young men.

FRANKLIN COUNTY.

Commonwealth v. Irvin Kees for fire of April 25, 1918.

On date of above fire, four men were stationed by forester R. G. Conklin to watch for the person who was responsible for a series of forest fires near the mouth of Stump Run. Irvin Kees was seen to strike a match and fire the leaves. The boy was immediately arrested and taken before justice of the peace Van T. Holman in Chambersburg. He told of setting two fires that day and two the day before. Also, of setting a number of other fires this spring and of some set last year. He implicated two other boys who were arrested, but were released the next day because of insufficient evidence against them. Irvin Kees is the illegitimate son of a poverty-stricken, half-witted colored woman who ought to be in a State Institution. The boy was placed in jail and held for court. On June 12, he appeared before Juvenile Court and was found guilty. On June 14th he was taken to Glen Mills School for an indefinite period.

Commonwealth v. Benjamin Carbaugh et al.

At a small fire that occurred on the evening of December 1st, three men were reported to have refused assistance to the forest fire warden. Instructions were issued to the warden to have a warrant sworn out before a justice of the peace, which was done on December 7th. Chief forest fire warden made personal investigation into the circumstances in connection with this case and as a result the suit was temporarily withdrawn.

LANCASTER COUNTY.

Guy Yohn, Roy Sentman, and George Cumens for fires of March 25-30, 1918.

As a result of a report by game protector, S. A. Keene, information was furnished the State Police who arrested the three defendants for maliciously firing woodlands, and took them to a justice of the peace in Christiana. Guy Yohn was bound over for Court under $300.00 bail and the other two under bail of $100.00 each. The district attorney reports:

> "That on May 4th, 1918, Guy Yohn entered his plea of guilty in the Court of Quarter Sessions of Lancaster county. Sentence was suspended and he entered the Army. The case as to George Cumens (a boy aged 15 years) and Roy Sentman has not been pressed. One of the reasons for not pressing the case against these two, is, that the testimony of Guy Yohn would be required. Another reason is, that Yohn was the leader of the crowd. Another reason is, that I am of the opinion that by holding these cases open against these boys, who are both out on bail, is possibly better than calling them for trial and a final disposition made of the case. The testimony as to the two boys is very meagre outside of Yohn's statement."

LUZERNE COUNTY.

Commonwealth v. Chas. Grosspeitsch for fire of Apr. 28, 1918.

Chief forest fire warden made a personal investigation and after Mr. Grosspeitsch denied responsibility for the fire, the facts were placed before the district attorney on July 19th. The case was assigned to the county detective. On July 29th, the district attorney informed us that information would be lodged against the defendant and case considered by the next grand jury. Nothing had been done up to December 31.

Commonwealth v. Juveniles for fire of April 28, 1918.

Fires were being set by five boys of Laurel Run borough who were caught in the act. On July 1st, chief forest fire warden and the local warden presented evidence to President Judge for consideration in Juvenile Court. Hearing was set for the following Saturday, but boys were never brought before the court.

MONROE COUNTY.

Commonwealth v. C. A. Myers for fire of May 9, 1916.

Forest fire started from spark thrown out by sawmill engine. The facts were laid before the district attorney, Ira A. LaBar. In 1917 this matter was referred to the district attorney for criminal action. In September 1918, our district forester reports that the district attorney had lost all papers in the case and had nothing upon which to act. Not having heard from district attorney since then, on December 31st the case was dropped, as far as this Department was concerned.

Commonwealth v. Jas. Keiper for fire of March 29th, 1918.

Mrs. Keiper told some of her neighbors that her husband was burning brush and that the fire escaped. On September 4th, information was given to the district attorney who asked that additional investigation be made by the State Police, to whom the case was referred.

NORTHUMBERLAND COUNTY.

On lands belonging to the Susquehanna Collieries Company, a number of juveniles trespassed during the month of March. They frequently started fires. On March 3d, a special officer of the company with the assistance of the game protector rounded up seventeen boys ranging in age from 10 to 17 years, and took them before a justice of the peace on a charge of trespassing. Each one was fined $2.00 and proportional amount of costs. On March 19th, 4 boys between 14 and 15 were arrested and fined for trespassing, $3.00 each and their proportion of costs.

POTTER COUNTY.

Commonwealth v. Frank Chilson for fires of April 24-28, 1918.

This young man was caught in the act of starting fires close to woodlands and when asked why he did it, replied "you couldn't do anything with me because I do not have any money." Prosecution was ordered. Case was placed in the hands of the county detective who reported that information was untrustworthy and case was dropped.

Commonwealth v. Juvenile for fire of March 29, 1918.

Fire occurred near Galeton borough. Boy was taken before a justice of the peace on May 4th and was parolled on good behavior. On account of extreme poverty of mother, claim for cost of extinction was canceled and action withdrawn.

Commonwealth v. McNamara on account of fire of Apr. 16, 1916.

Immediately after this fire, Frank McNamara left the community and is reported to have gone to a distant State. However, warrant was issued for him. On account of his not having returned to Pennsylvania on December 31st, warrant was returned and case closed.

SCHUYLKILL COUNTY.

Commonwealth v. Mt. Hope Coal Co. for fire of Apr. 10, 1917.

This Company was responsible for a number of forest fires along their right-of-way from mines to the breaker. Efforts were made to collect costs of extinction from the company without success. Case was finally referred to district attorney, C. A. Whitehouse who could not be induced to take action. Case and claims against this company were dropped September 20, 1918.

Commonwealth v. St. Clair Coal Company for fire of March 27, 1917.

Circumstances are similar to the above. Owing to our inability to get any action from the district attorney, the case was dropped December 31, 1918.

Commonwealth v. Lehigh Valley Railway Company for fires in April 1917.

This company has been responsible for a great many fires in Lehigh county and in other counties, as can be observed from the list of forest fires. Efforts have been made to start criminal action against this company in several different counties, but up to this time we have not been successful. In the above case we were unable to get Mr. Whitehouse, the district attorney of Schuylkill county, to start action; consequently case was finally dropped December 31, 1918.

Commonwealth v. Henry Iffert for fire of May 18, 1917.

This case appeared before a grand jury of Schuylkill county on November 19, 1917. Notwithstanding the fact that an exactly similar case was sent before the Court this case was ignored. The gentleman is reported to have made his boasts that he couldn't be touched. An effort was made by both District Forester McNeal and the chief forest fire warden to have the case reopened and presented to another grand jury. Every effort in this line, however, was blocked in some way and no action could be obtained. The case was finally dropped December 31, 1918.

SOMERSET COUNTY.

There was no legal action in connection with this item, although it is reported here because of the fact that it hinges upon the power of the chief forest fire warden as set forth in the law of 1915. Following fire of October 15th to 20th, which was started by an engine of the Muncy Lumber Company, the engine was declared a public nuisance and forbidden to run after November 15th without an efficient spark arrester. Superintendent of the operation had been warned several times concerning the probability of forest fires, if the engine were operated in its usual condition. The company itself reimbursed the Commonwealth for the cost of extinction of several previous fires.

The date first indicated was extended to November 25th upon notification from the officers of the company to the effect that a new spark arrester had been ordered but could not be delivered by the end of the first period. Before the 25th a new spark arrester was installed. It is worthy to note in this connection, the attitude of co-operation taken by this company. Even though they waited until the last step had to be taken, yet when this notice was sent to them they acted immediately and promised satisfactory co-operation for the future.

WESTMORELAND COUNTY.

Commonwealth v. Albert Caldwell for fire of March 25, 1918.

Fire was caused by spark from sawmill engine. On July 8th hearing was held before a justice of the peace and came up in August term of court. Case was lost because it could not be proved to the satisfaction of the jury that Mr. Caldwell was maliciously negligent in the operation of his plant. Subsequent to the criminal suit, civil suit was brought against Mr. Caldwell by one of the land owners damaged by the fire; a jury awarded him $75.00. Our forester appeared as an expert witness in the case.

Commonwealth v. Harry Roadman for fire of May 3, 1918.

Mr. Roadman's engine has been responsible for forest fires during the past several years. Claim for cost of extinction of the above fire was presented, but could be collected only after being placed in the hands of the justice of the peace. On August 31st, the justice forwarded to our forester, $6.50, covering our claim against Mr. Roadman.

On September 4, 1918 his engine was declared a public nuisance, and Mr. Roadman given until October 1st to have spark arrester installed. This was done promptly and since then precautions to prevent fire have been taken.

Commonwealth v. Blair Lumber Company for fire of Apr. 27, 1918.

Blair Lumber Company has been responsible for a great many fires in the neighborhood of their operations for some years and incidents in connection with this case are indications of the way in which such things are postponed. On August 16, 1918, Forester Bearer made information against the defendant before a justice of the peace of Ligonier. This action was taken after an interview with the district attorney. Our forester reports: "At our hearing before 'Squire Buell September 12th, David Blair gave bond to appear in Court. The engineer of the logging crew declared, while on oath, that during the day of this fire a spark arrester was on the engine, but the diaphragm screen was removed. He later said, however, that the screen was of little or no use in the prevention of fire and that only the spark arrester did that."

In letter of November 9th, forester reports that the district attorney informed him to the effect that "the indictment was improperly drawn up. Also, that the attorney who drew up the indictment, or approved it, did not forward it in time for November court."

CLAIMS.

I am glad to call particular attention to the assistance rendered by various foresters in settling claims and forest fire cases, particularly foresters Bearer, Ludwig, Emerick, Zerby, Bryner, and others. The splendid work which the foresters have done is simply one more proof that with a supervising organization we will be able to reduce the number of fires reported as of unknown origin and increase the number of cases brought to successful conclusion when it is necessary to take advantage of the law for imposing penalty.

All of the 1916 claims have been disposed of, but there are still a number of 1917 and 1918 claims to be satisfied. It has been our policy throughout the last two years to submit a claim for the cost of extinction to each person against whom we believe our forest fire warden had sufficient evidence to place responsibility. In a number of cases, of course, we learned later that the evidence which we had was not sufficient and in such cases claims were withdrawn. There were a number of other cases where we believed that very much more satisfactory results could be obtained from the viewpoint of forest protection, by entirely withdrawing our claim even though we knew that there was no question as to responsibility. Detailed statement of claims collected and withdrawn follows:

AMOUNTS RECEIVED IN 1918 ON ACCOUNT FOREST FIRES.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.		Paid to Fire Warden.
						General Fund.	School Fund.	
ARMSTRONG:								
Madison,	Nov. 14, 1917	Engine,	$5 70	Feb. 25, 1918	P. R. R.,	$5 70		
Madison,	Mar. 17, 1918	Engine,	8 60	June 10, 1918	P. R. R.,	8 60		
Madison,	Mar. 17, 1918	Engine,	1 50	June 10, 1918	P. R. R.,	1 50		
Madison,	Mar. 21, 1918	Engine,	7 85	May 11, 1918	P. R. R.,	7 85		
Madison,	Mar. 25, 1918	Engine,	6 50	May 11, 1918	P. R. R.,	6 50		
Madison,	Mar. 25, 1918	Engine,	1 50	May 11, 1918	P. R. R.,	1 50		
Madison,	Mar. 25, 1918	Engine,	11 80	May 11, 1918	P. R. R.,	11 80		
Madison,	Mar. 25, 1918	Engine,	3 60	June 10, 1918	P. R. R.,	3 60		
Madison,	Mar. 25, 1918	Engine,	2 00	June 10, 1918	P. R. R.,	2 00		
Mahoning,	Mar. 25, 1918	Engine,	7 70	Sept. 5, 1918	P. & S. R. R.,	7 70		
BEDFORD:								
Liberty,	Nov. 7, 1917	Engine,	45	May 20, 1918	H. B. T. R. R.,	45		
Liberty,	Nov. 8, 1917	Engine,	2 95	May 20, 1918	H. B. T. R. R.,	2 95		
E. Providence,	Nov. 20, 1917	Burning leaves,	3 80	Jan. 23, 1918	Z. T. Ritchey,	3 80		
Woodbury,	Mar. 17, 1918	Brush burning,	4 60	May 13, 1918	Dewey Lane,	4 60		
W. Providence,	April 4, 1918	Engine,	3 30	May 27, 1918	H. & B. T. M. R. R.,	3 30		
Londonderry,	April 24, 1918	Engine,	1 00	June 22, 1918	B. & O. R. R.,	1 00		
King,	May 18, 1918	Brush burning,	4 80		Lawrence Imler,			$4 80
BERKS:								
Longswamp,	Mar. 28, 1918	Engine,	1 35	Dec. 30, 1918	P. & R. R. R.,	1 35		
Greenwich,	April 5, 1918	Engine,	4 25	Dec. 30 1918	P. & R. R. R.,	4 25		
Albany,	May 7, 1917	Engine,	75	Dec. 30, 1918	P. & R. R. R.,	75		
Richmond & Ruscombmanor.	Mar. 23, 1918	Engine,	3 91	Oct. 9, 1918	P. & R. R. R.,	3 91		
BLAIR:								
Juniata,	May 18, 1917	Burning stumps,	7 20	Nov. 30, 1918	Elmer Diehl,	7 20		
Woodbury,	Mar. 20, 1918	Engine,	4 40	May 11, 1918	P. R. R.,	4 40		
Logan,	April 2, 1918	Boys,	3 10	April 22, 1918	J. P. Reilly,	3 10		
BRADFORD:								
Monroe,	April 18, 1917	Burning grass,	9 15	Oct. 2, 1918	Jerome Perry,	9 15		
Wyalusing,	April 7, 1918	Engine,	4 75	Sept. 13, 1918	L. V. R. R.,	4 75		
Wyalusing,	April 7, 1918	Engine,	6 20	Aug. 30, 1918	L. V. R. R.,	6 20		

AMOUNTS RECEIVED IN 1918 ON ACOUNT FOREST FIRES—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.		Paid to Fire Warden.
						General Fund.	School Fund.	
CAMBRIA:								
Richland,	April 26, 1917	Engine,	2 25	Aug. 7, 1918	B. & O. R. R.,	2 25		
Portage,	Nov. 10, 1917	Brush burning,	90	Jan. 8, 1918	Fred Dzarsteck,	90		
Dean,	Mar. 22, 1918	Engine,	7 20	July 19, 1918	A. & N. R. R.,	7 20		
Gallitzin,	Mar. 25, 1918	School boy,	1 80	June 17, 1918	Frank Koons,	1 80		
Clearfield,	April 27, 1918	Brush burning,	7 25	July 8, 1918	James McCans,	7 25		
Barr,	May 6, 1918	Brush burning,	3 60	June 12, 1918	Henry Natcher,	3 60		
Blacklick,	May 8, 1918	Engine,	44 25	Aug. 15, 1918	F. D. Clark,	44 25		
Susquehanna,	May 11, 1918	Boys,	16 70	June 17, 1918	Wm. Elliott,	16 70		
CAMERON:								
Gibson,	Mar. 10, 1918	Employe-smoking,	4 80	Oct. 16, 1918	P. R. R.,	4 80		
Gibson,	Mar. 14, 1918	Engine,	90	Oct. 16, 1918	P. R. R.,	90		
Gibson,	Mar. 16, 1918	Engine,	60	Oct. 16, 1918	P. R. R.,	60		
Gibson,	Mar. 19, 1918	Engine,	90	Oct. 16, 1918	P. R. R.,	90		
Portage,	Mar. 20, 1918	Engine,		July 2, 1918	P. R. R., damage to State land,		5 00	
Gibson,	Mar. 21, 1918	Engine,	90	Oct. 16, 1918	P. R. R.,	90		
Gibson,	May. 22, 1918	Engine,	60	Aug. 19, 1918	P. R. R.,	60		
CENTRE:								
Curtin,	Mar. 26, 1917	Dinkey,	22 45	Sept. 23, 1918	Centre Brick & Clay Co.,	18 25	4 20	
Snow Shoe,	April 25, 1917	Engine,	6 00	Nov. 9, 1918	N. Y. C. R. R.,	6 00		
Curtin & Snow Shoe,	May 9, 1917	Engine,	7 45	Nov. 9, 1918	N. Y. C. R. R.,		7 45	
Patton,	Mar. 20, 1918	Engine,	90	July 22, 1918	B. C. R. R.,	90		
Patton,	Mar. 20, 1918	Engine,	46 00	July 22, 1918	B. C. R. R.,	46 00		
Walker,	Mar. 24, 1918	Sawmill,	85 70	May 13, 28 June 4, 1918	John Lyons,	85 70		
Benner,	Mar. 24, 1918	Incendiary,	90 65	June 1, 1918	Mike Benzie & John Bonsok,	85 85	4 80	
Marion & Walker,	Mar. 25, 1918	Sawmill,	11 70	May 17, 1918	John Lyons,	11 70		
East Worth,	April 6, 1918	Brush burning,	7 90	May 14, 1918	Jos. Williams,	7 90		
East Worth,	May 8, 1918	Engine,	4 40	June 25, 1918	Superior Silica Brick Co.,	4 40		
CHESTER:								
Warwick,	April 25, 1918	Engine,	9 85	Oct. 9, 1918	P. & R. R. R.,	9 85		

CLEARFIELD:								
Morris,	April 16, 1917	Engine,	10 50	Nov. 9, 1918	N. Y. C. R. R.,	10 50		
Lawrence,	April 25, 1917	Engine,	3 00	Nov. 9, 1918	N. Y. C. R. R.,	3 00		
Huston,	Mar. 20, 1918	Engine,	24 75	June 29, 1918	P. R. R.,	24 75		
Huston,	Mar. 23, 1918	Engine,	2 25	June 29, 1918	P. R. R.,	2 25		
Girard,	Mar. 28-29, 1918	Brush burning,	10 10	May 28, 1918	Mrs. F. Kephart,	5 05*		
Pike,	May 8, 1918	Dinkey,	3 70	June 29, 1918	Curwensville Brick Co.,	3 70		
Jordan,	May 9, 1918	Engine,	33 90	Aug. 30, 1918	P. R. R.,	33 90		
CLARION:								
Paint,	May 15, 1917	Engine,	11 25	Sept. 13, 1918	B. & O. R. R.,	11 25		
Elk,	May 14, 1917	Engine,	5 70	Sept. 13, 1918	B. & O. R. R.,	5 70		
Paint,	May 16, 1917	Engine,	4 20	Sept. 13, 1918	B. & O. R. R.,	4 20		
CLINTON:								
Grugan,	April 10, 1917	Engine,	65	Nov. 9, 1918	N. Y. C. R. R.,	15	50	
Lamar,	April 4, 1917	Engine,	1 20	Nov. 19, 1918	C. R. of Pa.,	1 20		
Lamar,	April 11, 1917	Engine,	11 70	Nov. 19, 1918	C. R. of Pa.,	11 70		
Lamar,	April 11, 1917	Engine,	2 25	Nov. 19, 1918	C. R. of Pa.,	2 25		
Grugan,	April 12, 1917	Engine,	65	Nov. 9, 1918	N. Y. C. R. R.,	15	50	
COLUMBIA:								
Cunningham,	Nov. 18, 1917	Engine,	2 00	Jan. 5, 1918	L. V. R. R.,	2 00		
Beaver,	Nov. 18, 1917	Engine,	12 10	Aug. 26, 1918	P. & R. R. R.,	12 10		
Cunningham,	Nov. 20, 1917	Engine,	1 06	Jan. 5, 1918	L. V. R. R.,	1 06		
Cunningham,	Mar. 3, 1918	Burning R. R. Ties,	9 60	May 20, 1918	L. V. R. R.,	9 60		
Cunningham,	Mar. 31, 1918	Engine,	1 40	Sept. 2, 1918	L. V. R. R.,	1 40		
CUMBERLAND:								
Dickinson,	April 22 and May 1, 1914	Engine,		Dec. 30, 1918	P. & R. R. R.,			
					Damage to State land,		125 00	
Dickinson,	May 6-7	Engine,	18 55	Dec. 30, 1918	P. & R. R. R.,	18.55		
					Damage to State land,		931 45	
Middleton,	April 3-5	Engine,	48 00	Dec. 30, 1918	P. & R. R. R.,	48 30		
Cooke,	May 14, 1917	Engine,	3 30	Oct. 9, 1918	P. & R. R. R.,	90	2 40	
					Damage to State land,		20 00	
Dickinson,	May 14, 1917	Engine,	75 05	Oct. 9, 1918	P & R. R. R.,	58 80	16 25	
					Damage to State land,		975 00	
Cooke & Dickinson,	May 15, 1917	Engine,	56 83	Oct. 9, 1918	P. & R. R. R.,	46 83	10 00	
					Damage to State land,		200 00	
S. Middleton,	Nov. 8, 1917	Engine,	1 05	Oct. 9, 1918	P. & R. R. R.,	1 05		
S. Middleton,	Nov. 10, 1917	Engine,	40 56	Aug. 26, 1918	P. & R. R. R.,	40 56		
S. Middleton,	Mar. 7, 1918	Engine,	30	Oct. 9, 1918	P. & R. R. R.,	30		
S. Middleton,	Mar. 8, 1918	Engine,	15	Oct. 9, 1918	P. & R. R. R.,	15		
S. Middleton,	Mar. 16, 1918	Engine,	1 00	Aug. 26, 1918	P. & R. R. R.,	1 00		
S. Middleton,	Mar. 17, 1918	Engine,	45	Oct. 9, 1918	P. & R. R. R.,	45		
S. Middleton,	Mar. 19, 1918	Engine,	60	Oct. 9, 1918	P. & R. R. R.,	60		
S. Middleton,	Mar. 24, 1918	Engine,	45	Oct. 9, 1918	P. & R. R. R.,	45		
S. Middleton,	Mar. 25, 1918	Engine,	1 28	Oct. 9, 1918	P. & R. R. R.,	1 28		
S. Middleton,	Mar. 26, 1918	Engine,	45	Oct. 9, 1918	P. & R. R. R.,	45		

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*Balance of claim withdrawn.

AMOUNTS RECEIVED IN 1918 ON ACCOUNT FOREST FIRES—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.		Paid to Fire Warden.
						General Fund.	School Fund.	
S. Middleton,	Mar. 30, 1918	Engine,	50	Aug. 26, 1918	P. & R. R. R.,	50		
S. Middleton,	April 21, 1918	Engine,	8 70	Oct. 9, 1918	P. & R. R. R.,	8 70		
Cooke & Dickinson,	May 15, 1917	Engine,	31 10	Dec. 30, 1918	P. & R. R. R.,	17 60	13 50	
					Damage to State land,		310 60	
DAUPHIN:								
Lykens,	Mar. 15, 1918	Brush burning,	12 60	May 20, 1918	Mrs. Emanuel Snyder,	12 60		
Susquehanna,	Mar. 17, 1918	Engine,	5 20	May 20, 1918	P. R. R.,	5 20		
ELK:								
Benezette,	April 19-20, 1915	Engine,		Jan. 21, 1918	P. R. R.,			
					Damage to State land,		350 00	
Highland,	April 22, 1917	Engine,	39 60	Aug. 7, 1918	B. & O. R. R.,	39 60		
Highland,	May 3, 1917	Engine,	6 75	Aug. 7, 1918	B. & O. R. R.,	6 75		
Highland,	May 15, 1917	Engine,	61 65	Aug. 7, 1918	B. & O. R. R.,	61 65		
Benezette,	Mar. 17, 1918	Engine,	1 60	Aug. 19, 1918	P. R. R.,		1 60	
Benezette,	Mar. 18, 1918	Engine,	2 60	May 17, 1918	P. R. R.,	2 60		
Benezette,	Mar. 18, 1918	Engine,	3 80	May 17, 1918	P. R. R.,	2 20	1 60	
Jay,	Mar. 20, 1918	Engine,	8 40	May 17, 1918	P. R. R.,	6 00	2 40	
Benezette,	Mar. 21, 1918	Engine,	1 20	May 17, 1918	P. R. R.,		1 20	
Benezette,	Mar. 22, 1918	Engine,	1 20	May 17, 1918	P. R. R.,	1 20		
Millstone,	Mar. 23, 1918	Burning rubbish,	7 20	July 18, 1918	Mrs. Elmer Blumgreen,	7 20		
Benezette,	Mar. 25, 1918	Engine,	2 30	May 17, 1918	P. R. R.,	2 30		
Jay,	Mar. 28, 1918	Engine,	5 80	Nov. 19, 1918	P. R. R.,	3 80	2 00	
Fox,	Mar. 29-30, 1918	Engine,	22 95	Aug. 21, 1918	P. S. & N. R. R.,	22 95		
Benezette,	April 6, 1918	Engine,	7 40	Aug. 19, 1918	P. R. R.,	2 40		
Benezette,	April 6-7, 1918	Engine,	3 30	Nov. 19, 1918	P. R. R.,	3 30		
Benezette,	April 25, 1918	Engine,	6 20	Aug. 19, 1918	P. R. R.,	4 20	2 00	
Benezette,	May 16, 1918	Engine,	1 60	Nov. 19, 1918	P. R. R.,	1 60		
FAYETTE:								
Dunbar,	May 19, 1917	Engine,	12 75	Oct. 26, 1918	W. M. R. R.,	12 75		
Springfield,	Mar. 12, 1918	Engine,	4 05	May 20, 1918	I. C. R. R.,	4 05		
Georges,	Mar. 20, 1918	Brush burning,	39 88	Sept. 25, 1918	James Smiley,	15 00[a]		
Wharton,	Mar. 30, 1918	Brush burning,	10 30	Oct. 14, 1918	Ross Wirsing,	5 30[a]		
Stewart,	May 3, 1918	Brush burning,	4 10	Oct. 7, 1918	John Shafer,	4 10		
Stewart,	May 5, 1918	Burning leaves,	2 40	July 19, 1918	Walter Sesse,	2 40		

FOREST:								
Jenks,	Mar. 19, 1918	Engine,	2 25	Aug. 7, 1918	B. & O. R. R.,	2 25		
Jenks,	Mar. 20, 1918	Engine,	3 30	Aug. 7, 1918	B. & O. R. R.,	3 30		
Jenks,	Mar. 27, 1918	Engine,	75	Aug. 7, 1918	B. & O. R. R.,	75		
Jenks,	Mar. 29, 1918	Engine,	1 35	Aug. 7, 1918	B. & O. R. R.,	1 35		
Jenks,	Mar. 30, 1918	Engine,	60	Aug. 7, 1918	B. & O. R. R.,	60		
Jenks,	April 26, 1918	Engine,	15 80	Aug. 7, 1918	B. & O. R. R.,	15 80		
Jenks,	May 2, 1918	Engine,	75	Sept. 13, 1918	B. & O. R. R.,	75		
FRANKLIN:								
Peters,	April 19, 1918	Clearing lands,	2 34	June 17, 1918	Jacob Guyer,			2 34†
Metal,	Mar. 19, 1918	Burning brush,	25 00	June 24, 1918	J. Pearl Jones,	25 00		
HUNTINGDON:								
Tell,	May 11-12, 1916	Sawmill,	32 61	June 17, 1918	William Appleby,	32 61		
Clay,	May 12, 1917	Burning rubbish,	14 33	Sept. 25, 1918	E. B. T. R. R.,	14 33		
Walker,	Nov. 6, 1917	Engine,	3 00	Feb. 23, 1918	H. & B. T. R. & C. Co.,	3 00		
Porter,	Nov. 18, 1917	Dinkey,	39 80	April 2, 1918	Federal Refractories Co.,	39 80		
Lincoln,	Mar. 22, 1918	Engine,	9 30	May 27, 1918	Damage to State land,		200 00	
Lincoln,	Mar. 25, 1918	Engine,	8 10	May 27, 1918	H. & B. T. R. R.,	9 30		
Porter,	April 6, 1918	Engine,	3 50	July 8, 1918	H. & B. T. R. R.,	8 10		
					P. R. R.,	3 50		
JEFFERSON:								
Warsaw,	Mar. 20, 1918	Engine,	4 65	June 10, 1918	P. & S. R. R.,	4 65		
LACKAWANNA:								
Jefferson,	April 30, 1918	Sawmill,	7 90	July 19, 1918	Carl Hubbard,	7 90		
LUZERNE:								
Dennison,	May 10, 1916	Children,	3 05	Sept. 14, 1918	E. P. Searfoss,	3 05		
Creek,	April 3, 1917	Engine,	3 00	Jan. 26, 1918	L. V. R. R.,	3 00		
Creek,	April 25, 1917	Engine,	55 35	Jan. 26, 1918	L. V. R. R.,	55 35		
Creek,	May 7, 1917	Engine,	24 60	Jan. 26, 1918	L. V. R. R.,	24 60		
Lehman,	April 6, 1918	Brush burning,	1 20	Aug. 19, 1918	Andrew Kuerinke,	1 20		
LYCOMING:								
Fairfield,	April 10, 1917	Sawmill,	1 95	Nov. 23, 1918	R. C. & O. O. Bittinger,	1 95		
Brown & McHenry,	April 11, 1917	Engine,	27 95	Nov. 9, 1918	N. Y. C. R. R.,	23 15	4 80	
Watson,	Nov. 15, 1917	Engine,	16 55	July 2, 1918	E. R. R.,	16 55		
Nippenose,	Mar. 23, 1918	Burning brush,	22 75	May 17, 1918	Wm. Ritter,	22 75		
Cummings & Watson,	May 9-12, 1918	Burning brush,	188 60	July 8, 1918	Henry Fritz,	176 00	12 60	
					Damage to State Land,		50 00	
McKEAN:								
Keating,	Nov. 6, 1917	Brush burning,	3 80	Jan. 28, 1918	G. H. McCoy,	3 80		
Hamlin,	Mar. 16, 1918	Engine,	70	July 9, 1918	P. S. & N. R. R.,	70		
Annin,	Mar. 31, 1918	Brush burning,	9 50	May 11, 1918	Wesley Kinney,	9 50		
Hamlin,	May 3, 1918	Burning rubbish,	10 70	June 22, 1918	Mrs. Barnes,	2 00*		

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†Worked out by boy responsible.

*Balance of claim withdrawn.

AMOUNTS RECEIVED IN 1918 ON ACCOUNT FOREST FIRES—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.		Paid to Fire Warden.
						General Fund.	School Fund.	
MIFFLIN:								
Brown,	Nov. 10, 1917	Engine,	3 50	Feb. 1, 1918	P. R. R.,	3 50		
Granville,	April 7, 1918	Engine,	12 05	June 25, 1918	P. R. R.,	12 05		
MONROE:								
Pocono,	May 19, 1917	Engine,	60 90	Dec. 23, 1918	W. B. & E. R. R.,	60 90		
Tobyhanna,	May 19, 1917	Engine,	20 40	July 26, 1918	W. B. & E. R. R.,	20 40		
Paradise,	Mar. 25, 1918	Brush burning,	12 65	July 5, 1918	H. C. Lockwood,	12 65		
Tobyhanna,	Mar. 31. 1918	Engine,	70 85	Dec. 23, 1918	W. B. & E. R. R.,	70 85		
Coolbaugh & Tobyhanna	April 1, 1918	Engine,	17 20	Dec. 23, 1918	W. B. & E. R. R.,	17 20		
NORTHUMBERLAND:								
Shamokin & Zerby,	Mar. 23, 1918	Engine,	6 40	Aug. 26, 1918	P. & R. R. R.,	6 40		
Zerby,	Mar. 23, 1918	Engine,	14 00	Aug. 26, 1918	P. & R. R. R.,	14 00		
Shamokin & Zerby,	Mar. 24, 1918	Engine,	11 00	Aug. 26, 1918	P. & R. R. R.,	11 00		
Jackson,	April 1, 1918	Engine,	1 30	Aug. 26, 1918	P. & R. R. R.,	1 30		
Coal,	April 26, 1918	Engine,	6 10	June 29, 1918	P. R. R.,	6 10		
PIKE:								
Westfall,	April 13, 1917	Brush burning,	2 40	Nov. 25, 1918	Stephen Schafer,	2 40		
Milford & Westfall,	April 27, 1918	Engine,	21 30	Nov. 2, 1918	Erie R. R.,	21 30		
POTTER:								
Sharon,	April 10, 1917	Engine,	2 40	Sept. 16, 1918	N. Y. & P. R. R.,	2 40		
Galeton,	Mar. 19, 1918	Bon-fire,	7 10	April 16, 1918	Mrs. Dan Shine,	7 10		
Summit,	Mar. 21, 1918	Burning rubbish,	1 00	June 8, 1918	A. W. Ayres,	1 00		
Eulalia,	Mar. 30, 1918	Engine,	29 70	Aug. 27, 1918	C. & P. A. R. R.,	29 70		
Roulette,	April 6, 1918	Engine,	15 40	Aug. 27, 1918	C. & P. A. R. R.,	15 40		
SCHUYLKILL:								
Tremont,	Mar. 19, 1918	Engine,	10 40	Dec. 30, 1918	P. & R. R. R.,	10 40		
Tremont,	Mar. 20, 1918	Engine,	13 90	Dec. 30, 1918	P. & R. R. R.,	13 90		
New Castle,	April 7, 1918	Engine,	10 50	June 29, 1918	P. R. R.,	10 50		
Tremont,	April 23, 1918	Engine,	1 40	Oct. 9, 1918	P. & R. R. R.,	1 40		
Barry,	May 8, 1918	Engine,	6 90	Dec. 30, 1918	P. & R. R. R.,	6 90		

SOMERSET:								
Larimer & Greenville,	April 22, 1918	Engine,	12 35	Oct. 28, 1918	W. M. R. R.,	12 35		
Jefferson,	May 16, 1917	Engine,	13 35	Jan. 26, 1918	Schofield Lumber Co.,	13 35		
Northampton,	Nov. 18, 1917	Engine,	4 05	Mar. 15, 1918	B. & O. R. R.,	4 05		
Quemahoning,	Mar. 17, 1918	Engine,	3 50	Nov. 1, 1918	B. & O. R. R.,	3 50		
Fair Hope,	Mar. 18, 1918	Engine,	90	June 22, 1918	B. & O. R. R.,	90		
Quemahoning,	Mar. 13, 1918	Engine,	2 55	Nov. 1, 1918	B. & O. R. R.,	2 55		
Fair Hope,	Mar. 24, 1918	Engine,	2 00	June 22, 1918	B. & O. R. R.,	2 00		
Quemahoning,	Mar. 25, 1918	Engine,	1 25	Nov. 1, 1918	B. & O. R. R.,	1 25		
Stony Creek,	Mar. 25, 1918	Engine,	95	Nov. 1, 1918	B. & O. R. R.,	95		
Quemahoning,	Mar. 25, 1918	Engine,	75	Nov. 1, 1918	B. & O. R. R.,	75		
Stony Creek,	Mar. 28, 1918	Engine,	1 25	Nov. 1, 1918	B. & O. R. R.,	1 25		
Northampton,	Mar. 30, 1918	Engine,	4 45	June 22, 1918	B. & O. R. R.,	4 45		
Northampton,	Mar. 20, 1918	Brush burning,	8 50	Aug. 17, 1918	Wm. Cook,	8 50		
Quemahoning,	Mar. 25, 1918	Engine,	15 20	June 29, 1918	B. & O. R. R.,	15 20		
Black,	Mar. 30, 1918	Engine,	7 20	June 29, 1918	B. & O. R. R.,	7 20		
Shade,	April 27, 1918	Brush burning,	60	June 19, 1918	John Shull,	60		
Summit & Granville,	May 18, 1917	Brush burning,	126 80	Oct. 14, 1918	George Friend,	12 00*		
Summit & Elk Lick,	Oct. 16-20, 1918	Dinkey,	122 30	Nov. 10, 1918	Muncy Lumber Co.,			122 30
SULLIVAN:								
Cherry,	Nov. 11, 1917	Engine,	3 80	June 5, 1918	L. V. R. R.,	3 80		
Cherry,	Mar. 27, 1918	Engine,	5 50	Aug. 30, 1918	L. V. R. R.,	5 50		
Cherry,	Mar. 27, 1918	Engine,	4 50	Aug. 30, 1918	L. V. R. R.,	4 50		
Cherry,	Mar. 30, 1918	Engine,	30 00	Sept. 13, 1918	L. V. R. R.,	30 00		
Cherry,	Mar. 31, 1918	Engine,	18 30	Sept. 13, 1918	L. V. R. R.,	18 30		
Cherry,	Mar. 31, 1918	Engine,	18 00	Sept. 13, 1918	L. V. R. R.,	18 00		
Cherry,	Mar. 31, 1918	Engine,	29 50	Aug. 30, 1918	L. V. R. R.,	29 50		
Cherry,	April 2, 1918	Engine,	1 50	Sept. 13, 1918	L. V. R. R.,	1 50		
SUSQUEHANNA:								
Lanesboro & Harmony,	Mar. 29, 1918	Engine,	5 70	Nov. 13, 1918	Erie R. R.,	5 70		
Thompson,	April 1, 1918	Engine,	3 00	Aug. 30, 1918	D. & H. R. R.,	3 00		
TIOGA:								
Morris,	April 10, 1917	Engine,	17 55	Mar. 25, 1918	Erie R. R.,	17 55		
Duncan,	April 29, 1917	Engine,	17 25	Nov. 9, 1918	N. Y. C. R. R.,	17 25		
Bloss,	Mar. 28, 1918	Engine,	10 80	Nov. 13, 1918	Erie R. R.,	10 80		
Morris,	Mar. 29, 1918	Burning right-of-way,	2 40	April 2, 1918	T. C. Harbeson,			2 40†
Covington,	April 27, 1918	Brush burning,	8 00	April 27, 1918	Robert Wilson,			8 00†
VENANGO:								
Sugarcreek,	Mar. 29, 1918	Burning rubbish,	19 48	June 17, 1915	Miss H. Jean McKinley,	19 48		
Cherry Tree,	May 5, 1918	Engine,	6 80	July 19, 1918	P. R. R.,	6 80		
WARREN:								
Freehold,	April 28, 1917	Engine,	5 70	Nov. 1, 1918	Erie R. R.,	5 70		
Glade,	May 3, 1918	Road engine,	10 20	Nov. 1, 1918	S. S. Hoag,			10 20

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*Balance of claim withdrawn.

†Paid by party responsible without claim from this office.

AMOUNTS RECEIVED IN 1918 ON ACCOUNT OF FOREST FIRES—Continued.

Township.	Date of Fire.	Cause.	Cost of Extinction.	Date of Settlement.	Party Responsible.	Paid to State Treasurer.		Paid to Fire Warden.
						General Fund.	School Fund.	
WAYNE:								
Buckingham,	April 7, 1918	Engine,	46 85	June 24, 1918	N. Y. O. & W. R. R.,	46 85		
WESTMORELAND:								
Derry,	April 11, 1917	Brush burning,	3 69	Oct. 3, 1918	J. C. McClure,	3 69		
Fairfield,	April 11, 1917	Brush burning,	9 60	Oct. 28, 1918	Wm. Deemer,	4 00*		
Ligonier,	Mar. 29, 1918	Brush burning,	10 20	June 10, 1918	T. O. Riffle,	10 20		
Penn,	April 5, 1918	Brush burning,	4 50	June 10, 1918	John Stinson,	4 50		
Ligonier,	April 5, 1918	Engine,	13 60	Sept. 19, 1918	Lig. V. R. R.,	13 60		
Derry,	April 28, 1918	Engine,	13 30	Sept. 19, 1918	Lig. V. R. R.,	13 30		
Unity,	May 3, 1918	Sawmill,	6 50	Sept. 2, 1918	Harry Roadman,	2 10	4 40	
WYOMING:								
Falls,	April 11, 1917	Brush burning,	9 15	Sept. 27, 1918	Willard Frantz,	9 15		
Washington,	Mar. 17, 1918	Engine,	10 40	Aug. 30, 1918	L. V. R. R.,	10 40		
Falls,	Mar. 30, 1918	Engine,	15 80	Sept. 13, 1918	L. V. R. R.,	15 80		
Noxen,	April 1, 1918	Engine,	8 30	Sept. 13, 1918	L. V. R. R.,	8 30		
Falls,	April 2, 1918	Engine,	3 90	Sept. 13, 1918	L. V. R. R.,	3 90		
Tunkhannock,	April 7, 1918	Engine,	16 60	Aug. 30, 1918	L. V. R. R.,	16 60		
Totals,						$2,402 20	$3,258 65	$150 04
Grand total,						$5,810 89		

*Balance of claim withdrawn.

REFUNDS ON ACCOUNT FIRE EXTINCTION AND PATROL RETURNED TO STATE TREASURER.

Township.	Date of Fire.	Date Received.	Amount.
CAMBRIA:			
Susquehanna,	Mar. 25, 1918,	April 16, 1918,	$5 40
CHESTER:			
Warwick,	April 26, 1918,	June 19, 1918,	1 00
HUNTINGDON:			
Union,	April 11, 1917,	April 10, 1918,	1 50
Walker,	April 6, 1918,	May 26, 1918,	6 20
INDIANA:			
East Wheatfield,	April 27 & 29, 1918,	June 14, 1918,	3 00
LACKAWANNA:			
Lehigh,	April 6-7, 1918,	June 18, 1918,	6 70
MIFFLIN:			
Brown & Union,	Mar. 31, 1918,	April 25, 1918,	80
SOMERSET:			
Northampton,	May 18, 1917,	Jan. 2, 1918,	5 85
WESTMORELAND:			
	Patrol,	June 14, 1918,	2 75
WYOMING:			
	1915,	Jan. 11, 1918,	10 00
	1915,	May 11, 1918,	13 97
YORK:			
Springetsbury,	Mar. 26, 1918,	Oct. 16, 1918,	20 70
Total,			77 87

CLAIMS FOR FIRE EXTINCTION PRESENTED AND LATER WITHDRAWN, 1918.

Township.	Date of Fire.	Cost of Extinction.	Date of Withdrawal.	Reason for Withdrawal.
ADAMS:				
Hamiltonban,	Nov. 20, 1916	$5 44		Poverty.
BERKS:				
Rockland,	April 2, 1917	5 10	April 28, 1918	Poverty.
BLAIR:				
Frankstown,	May 16, 1916	7 30	Mar. 13, 1918	Own land.
Frankstown,	May 14, 1917	12 01	Sept. 21, 1918	Own land.
Logan,	April 2, 1918	6 30	May 18, 1918	Poverty.
CAMBRIA:				
Richland,	Mar. 29, 1918	8 10	May 24, 1918	Assistance at other fires.
Gallitzin,	April 6, 1918	28 60	June 24, 1918	Lack of evidence.
Lower Yoder,	May 15, 1917	25 75	Nov. 27, 1918	Could not be sustained.
CENTRE:				
Rush,	Mar. 25, 1918	72 00	Aug. 27, 1918	Poverty.
Liberty,	Mar. 30, 1918	27 45	April 30, 1918	Lack of evidence.
Spring & Boggs,	April 1, 1918	143 40	June 21, 1918	Lack of evidence.
CHESTER:				
Valley,	April 1, 1918	5 25	May 31, 1918	Lack of evidence.
CLARION:				
Hawthorn,	Mar. 30, 1918	2 40	Sept. 18, 1918	Lack of evidence.
Hawthorn,	April 26, 1918	8 90	Sept. 18, 1918	Lack of evidence.
CLEARFIELD:				
Girard,	Mar. 29-30, 1918.	40 60	April 24, 1918	Poverty.
CLINTON:				
Gallagher,	April 17, 1917	10 20	Sept. 9, 1918	Lack of evidence.
DAUPHIN:				
Wayne,	April 11, 1916	20 30	Mar. 13, 1918	Lack of evidence.
FAYETTE:				
Georges,	April 18, 1917	1 90	Oct. 14, 1918	Promise to install better equipment.
Henry Clay,	May 19, 1917	7 20	Oct. 14, 1918	General help.
Henry Clay,	May 19-21, 1917.	88 96	Sept. 25, 1918	Lack of evidence.
Stewart,	Mar. 16, 1918	1 50	April 29, 1918	Lack of evidence.
Stewart,	Mar. 23, 1918	3 90	April 29, 1918	Lack of evidence.
Springfield,	April 27, 1918	13 35	July 9, 1918	Lack of evidence.
HUNTINGDON:				
Warriors Mark,	May 10, 1916	7 32	Mar. 13, 1918	Poverty.
Warriors Mark	Mar. 26, 1917	14 75	Oct. 7, 1918	Death of party responsible.
Henderson,	Mar. 25, 1918	16 80	July 15, 1918	Lack of evidence.
INDIANA:				
Cherryhill,	April 6, 1918	12 30	July 13, 1918	Lack of evidence.
Cherryhill,	April 6, 1918	25 50	July 13, 1918	Poverty.
JEFFERSON:				
Eldred,	May 12, 1917	2 80	Jan. 17, 1918	Poverty and age.
JUNIATA:				
Juniata,	Nov. 7, 1917	1 40	Sept. 18, 1918	Uncertain evidence.
LUZERNE:				
Dorrance,	Mar. 25, 1918	35 70	June 5, 1918	Not responsible.
LYCOMING:				
Cummings,	April 27, 1918	620 20	Aug. 19, 1918	Boy worked out claim.
McKEAN:				
Hamilton,	Mar. 22, 1918	1 80	Oct. 21, 1918	Grass fire.
Hamilton,	Mar. 22, 1918	1 20	Oct. 21, 1918	Grass fire.

CLAIMS FOR FIRE EXTINCTION PRESENTED AND LATER WITHDRAWN, 1918—Continued.

Township.	Date of Fire.	Cost of Extinction.	Date of Withdrawal.	Reason for Withdrawal.
MIFFLIN:				
Menno,	April 11, 1917	20 08	Sept. 23, 1918	Poverty and sickness.
MONROE:				
Hamilton,	May 9, 1916	17 05	Dec. 30, 1918	Lack of evidence.
MONTOUR:				
West Hemlock,	Mar. 30, 1918	21 98	May 14, 1918	Poverty.
NORTHUMBERLAND:				
Coal,	Nov. 9, 1917	3 82	Feb. 5, 1918	Lack of evidence.
Coal,	Nov. 10, 1917	3 83	Feb. 5, 1918	Lack of evidence.
Coal,	Nov. 7, 1917	17 40	Feb. 5, 1918	Lack of evidence.
PIKE:				
Dingman,	May 17, 1917	4 95	Nov. 25, 1918	Lack of evidence.
Westfall,	Nov. 14, 1917	14 75	Jan. 2, 1918	Poverty.
Palmyra,	Mar. 30, 1918	27 90	July 22, 1918	Poverty.
POTTER:				
Pike,	May 10-11, 1916.	3 33	Mar. 20, 1918	Lack of evidence.
Homer,	May 11-12, 1916.	12 25	Mar. 20, 1918	Outside of State.
Portage,	April 11, 1918	2 10	Sept. 27, 1918	Unnecessary expense on part of Forester.
Pike,	April 18, 1917	6 60	Sept. 20, 1918	Unnecessary assistance.
Roulette,	May 13, 1917	4 00	Dec. 18, 1918	Lack of evidence.
Eulalia,	May 16, 1917	8 50	Oct. 9, 1918	Own land.
Galeton,	Mar. 29, 1918	84 35	May 13, 1918	Poverty.
Hebron,	April 7, 1918	11 30	May 11, 1918	Poverty.
SCHUYLKILL:				
East Norwegian,	April 10, 1917	9 60	Sept. 20, 1918	Lack of evidence.
West Penn,	April 20, 1917	1 80	Sept. 20, 1918	Unable to find party responsible.
SOMERSET:				
Addison,	Nov. 29, 1917	6 80	Jan. 30, 1918	Poverty.
TIOGA:				
Shippen,	Aug. 19-23, 1916.	14 95	Dec. 30, 1918	Lack of evidence.
Hamilton,	April 4, 1917	4 05	Oct. 21, 1918	Lack of evidence.
Gaines,	May 2, 1917	1 50	Oct. 9, 1918	No financial standing.
Gaines,	May 15, 1917	3 15	Oct. 9, 1918	Party has paralysis.
Victory,	May 14, 1917	33 75	Oct. 21, 1918	Lack of evidence.
WAYNE:				
Dresher,	April 3, 1917	11 90	May 20, 1918	Mentally deficient.
WYOMING:				
Clinton,	April 18, 1917	2 50	Oct. 7, 1918	Own land and promises of care.
YORK:				
Fairview,	May 14, 1917	2 85	Sept. 27, 1918	Own land and aid unnecessary.
Lower Chanceford,	Nov. 8, 1917	3 75	Jan. 2, 1918	Lack of evidence.
Total,		$915 00		

"FIRE IN THE FOREST STARTED BY ACCIDENT OR CARELESSLY DOES JUST AS MUCH DAMAGE AS A FIRE STARTED INTENTIONALLY."

"IT IS BETTER TO PREVENT AN OFFENSE THAN TO BE OBLIGED TO PUNISH IT."

"A FIRE ON ONE FOREST TRACT CONSTITUTES A POTENTIAL DANGER TO THOUSANDS OF ACRES IN THE IMMEDIATE LOCALITY."

UNTIL PUBLIC OPINION RECOGNIZES THE VALUE OF THE FOREST AND THE FORCES WHICH PRODUCE FORESTS, AND UNTIL THE UNNECESSARY DESTRUCTION OF SUCH FORCES IS RECOGNIZED AS A CRIME TO BE PUNISHED, THE WELFARE OF PENNSYLVANIA IS BEING UNDERMINED INSTEAD OF BEING INSURED.

FOREST PROTECTION HAS BEEN, IS NOW, AND ALWAYS WILL BE THE KEYSTONE OF FOREST CONSERVATION.

AT THE PRESENT RATE OF FOREST TREE PLANTING, IN PENNSYLVANIA IT WOULD REQUIRE OVER 50 YEARS TO RESTOCK THE AREA BURNED OVER IN 1918.

FIRES STRIKE AT THE ROOT OF THE FOREST AND DESTROY THE FACTORS WHICH MAKE IT MOST VALUABLE TO MAN.

LOYAL PENNSYLVANIA CITIZENS WILL CO-OPERATE FOR FOREST FIRE PREVENTION.

THE RESULTS OF FOREST FIRES TOUCH THE LIFE OF EVERY INDIVIDUAL IN THE COMMONWEALTH. IT IS THE DUTY, THEREFORE, OF EVERY INDIVIDUAL TO DO HIS SHARE IN THEIR SUPPRESSION AND PREVENTION.

ANY SYSTEM OF FORESTRY IS DOOMED, AND IS THE LIMIT OF INEFFICIENCY, IF THE FOREST FIRES ARE NOT SUPPRESSED.

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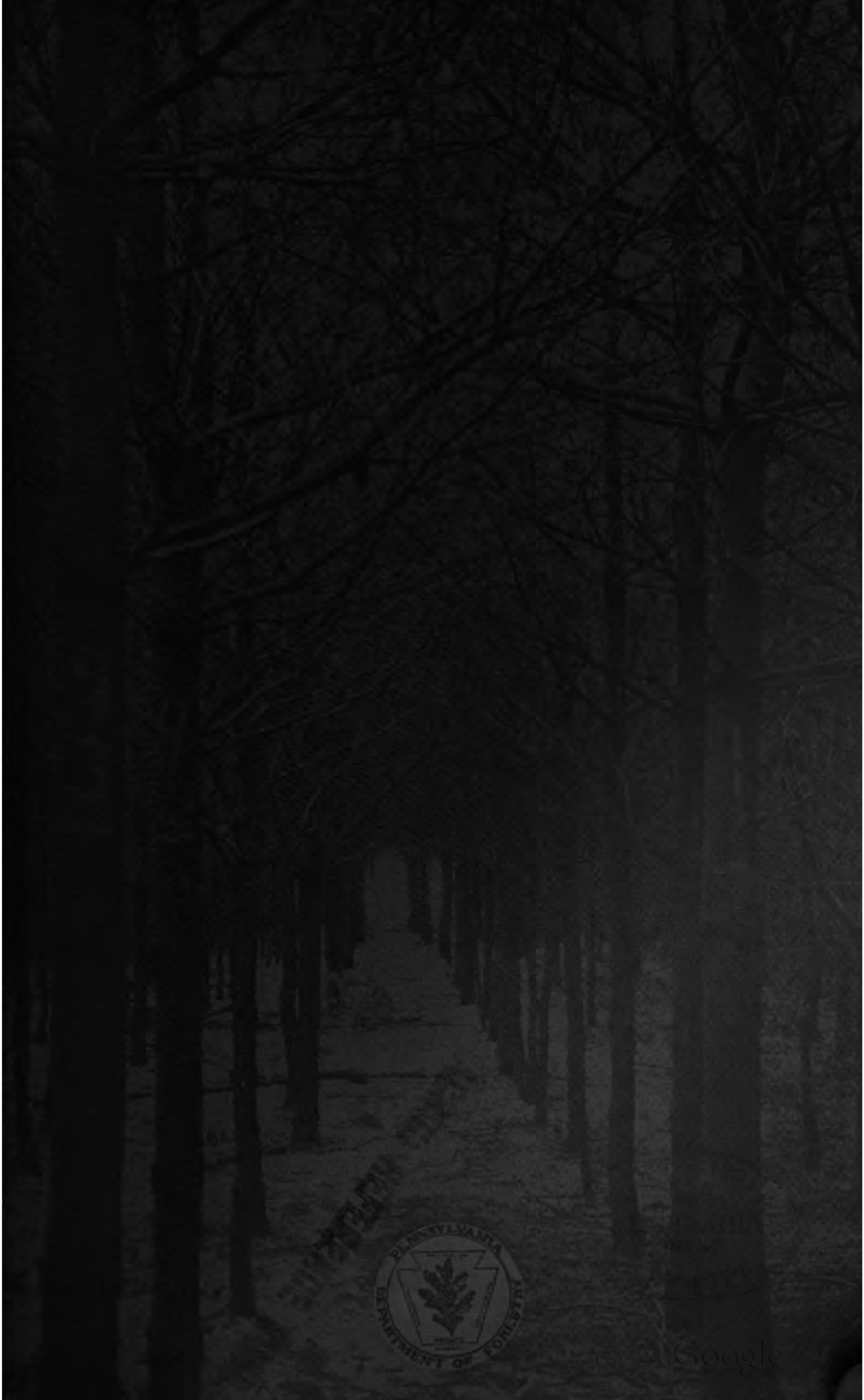
IF FORESTS ARE TO BE GROWN, FIRES MUST BE PREVENTED. IT IS A LONG TIME FROM SEEDLING STAGE TO HARVESTING STAGE. PROTECTION FROM FIRE MUST BE COMPLETE AND CONTINUOUS.

FIRES CAN BE KEPT FROM PENNSYLVANIA FORESTS, BUT IT WILL TAKE TIME, WORK, AND MONEY.

FOREST FIRES ARE NOT INEVITABLE, UNPREVENTABLE, OR ACCIDENTAL OCCURRENCES. THEY RESULT FROM NEGLIGENCE OR MALICIOUSNESS.


PENNSYLVANIA
DEPARTMENT OF FORESTRY

FOREST TREE PLANTING SUGGESTIONS

WHEN TO PLANT

WHAT TO PLANT

HOW TO PLANT

WHERE TO PLANT

PENNSYLVANIA DEPARTMENT OF FORESTRY

GIFFORD PINCHOT, Commissioner

BULLETIN 20

FEBRUARY, 1922.

FOREST TREE PLANTING INSTRUCTIONS.

TIME TO PLANT.—Forest tree seedlings may be planted in the spring after the frost has come out of the ground and before the new growth has started, or in the fall before the ground is frozen. Wherever possible, planting should be done in the spring because growth begins at once, and usually more of the trees succeed. If the trees are set out in the fall greater care is required in the planting operation. They may be "heaved out" of heavy soil by frost the first winter after planting.

AGE AND SIZE OF PLANTING STOCK.—The age and size of the planting stock depends largely upon the condition of the planting site. If no heavy sod, dense weeds, or sprouts grow on the area, trees from 4 to 8 inches in height may be planted. This will result in the largest number of living trees at the lowest planting cost. The larger the planting stock the greater will be the cost of planting, and the harder it will be to get the trees to grow. Consequently small planting stock should be used unless there is good reason for doing otherwise.

As a general rule, trees of the following ages are the right size for the usual planting site in Pennsylvania:—

White pine	2 or 3 yrs.	Walnut	1 yr.
Pitch pine	2 yrs.	Ash	1 yr.
Red pine	2 or 3 yrs.	Honey locust	1 yr.
Norway spruce	3 or 4 yrs.	Red oak	1 yr.
Larch	2 yrs.	White oak	2 yrs

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST COMMISSION

Gifford Pinchot, Commissioner of Forestry.

Dr. J. T. Rothrock.

Edward Bailey.

Henry W. Shoemaker.

Mrs. John L. Lawrence.
(Mary Flynn Lawrence.)

Robert Y. Stuart, Deputy Commissioner of Forestry.

Alfred E. Rupp, Chief, Bureau of Lands.

Lewis E. Staley, Chief, Bureau of Operation.

George H. Wirt, Chief, Bureau of Protection.

John W. Keller, Chief, Bureau of Silviculture.

W. E. Montgomery, Chief, Office of Maintenance.

A. O. Vorse, Chief, Office of Information.

Joseph S. Illick, Chief, Office of Research.

E. A. Ziegler, Director, State Forest Academy.

CARE OF PLANTING STOCK.—Immediately upon receipt, the trees should be taken to the place where they are to be planted. If they cannot be set out the same day they should be "heeled in." For this purpose select a place in well-drained soil which is not stony and where water is available. An open trench should be dug with one side almost vertical. Take bunches of trees from the shipping boxes and wet the roots thoroughly. Then cut the strings and place the trees upright in a thin layer against the vertical side of the trench. A bunch of trees should be spread over about six inches in the trench. Fine soil should be placed against the roots and lower part of the stems, and firmed with the foot.

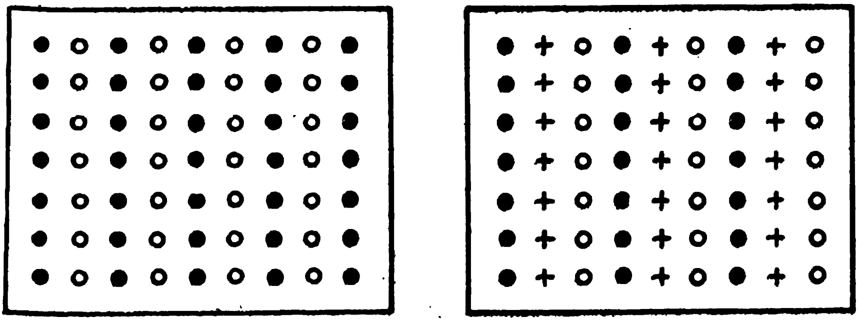
HOW TO PLANT.—The roots must be kept moist at all times. If they are allowed to dry out the tree may die. Two persons make a good planting crew, a mattock man to dig the holes and a planter to set the trees. Dig the holes in rows. The distance between rows, and also the distance between trees in each row, is usually five to six feet. The spacing will depend upon the kind of tree used, the quality of soil, and on what is now growing on the area.

Where the ground is not stony nor the sod heavy, one stroke with the mattock will usually make a hole large enough to plant a 2-year-old seedling. The hole should be big enough to let the roots spread. Loose dirt is carefully drawn to the edge of the hole where it can be easily reached by the planter. If the sod is heavy at least one square foot should be turned back with the mattock, and a hole made in the loose earth.

Trees should be "heeled-in" if they cannot be planted the day they are received.

The planter with a supply of trees in a pail follows the mattock man. The pail should contain about an inch of water to keep the roots moist. Holding a tree in his left hand the planter sets it in the hole as deep as it was in the nursery, as shown by the "collar" on the seedling. The roots should be spread out and loose earth pressed over and around them with the right hand. The remaining loose dirt is then drawn into the hole and packed firmly with a mallet, a stone, or the heel of the shoe. No grass, leaves, or stones should come in contact with the roots. When properly planted the seedling will stand upright and be so firm that it cannot easily be pulled up.

PROTECTIVE MEASURES.—As a rule each destructive insect or disease attacks trees of one species only. Nearby trees of other species may not be affected. The chestnut blight attacks only the chestnut, the white pine weevil attacks chiefly the white pine and the locust borer works wholly in the black locust. To guard against loss from insect attacks or diseases, areas larger than an acre should be planted to a mixture of two or more kinds of trees that have the same needs for soil and light and the same rate of growth. This can most easily be done by alternate rows, as shown in illustration below.



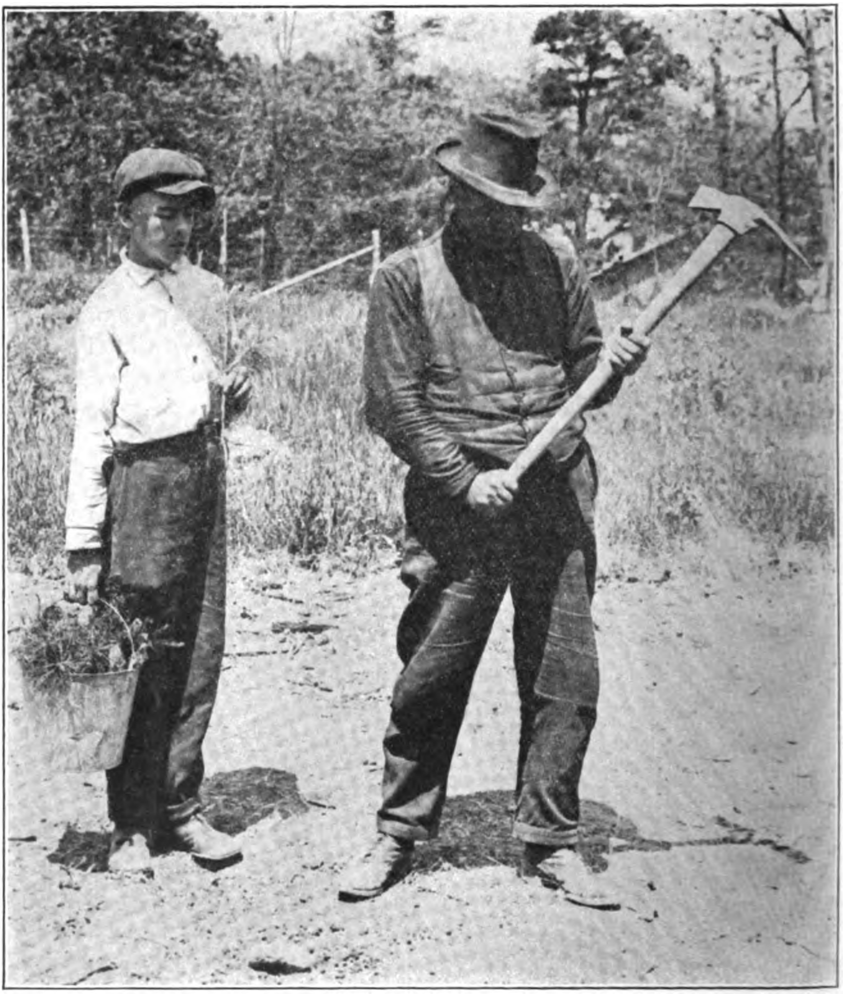
Using two species

Using three species

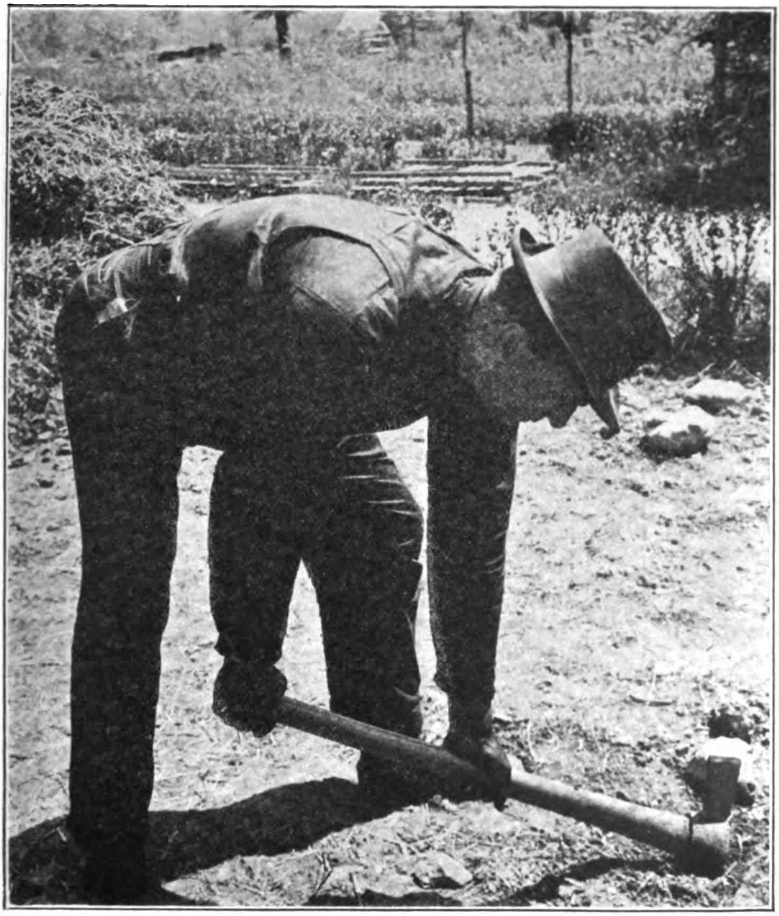
ALTERNATING BY ROWS.

When white pine is planted all cultivated or wild currant and gooseberry bushes growing within 300 feet should be destroyed. The best way is to pull them up by the roots and hang the plants on nearby trees or brush so that they cannot take root again. This is to guard against the Blister Rust, a fungus disease that kills white pines. The Blister Rust cannot spread from pine to pine but must spend a part of its life on the under side of currant and gooseberry leaves, from which spores spread to the pines and cause the rust.

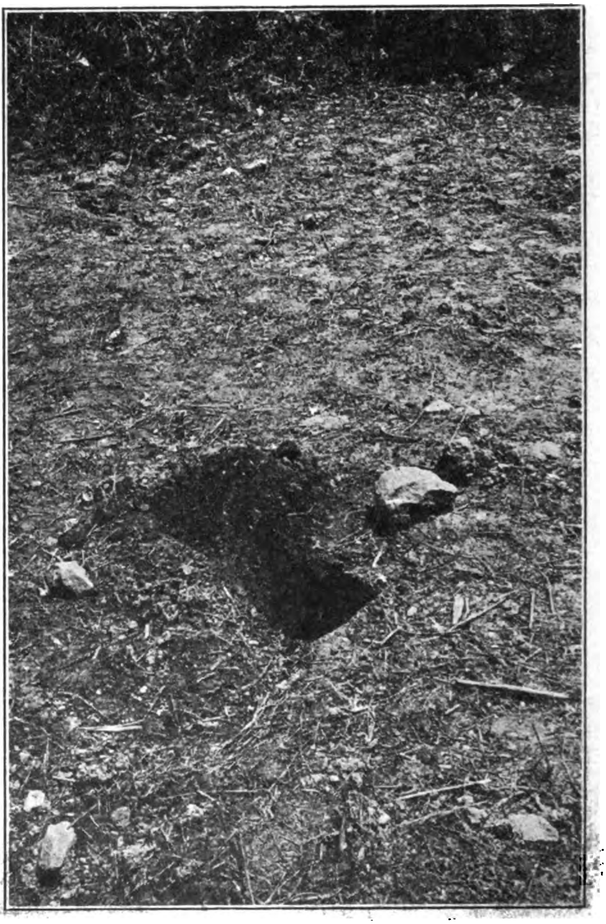
Live stock will eat the leaves and tender twigs of hardwood seedlings and root up, break, and tramp down small evergreens. No plantation can succeed when animals are allowed to graze over or root up the planted site.



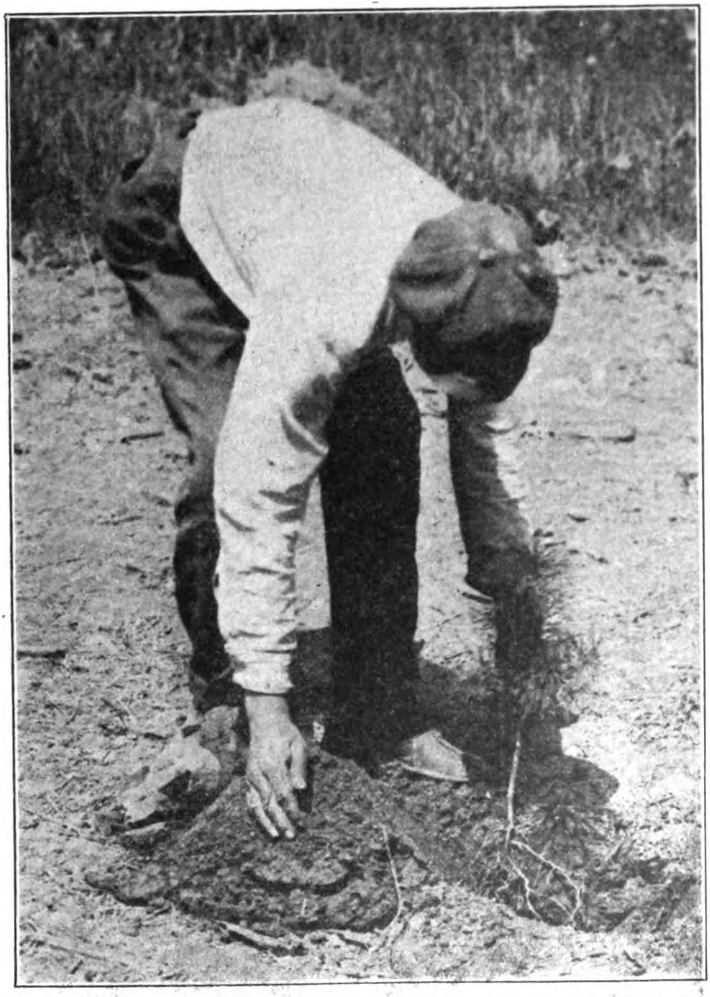
Two persons make a planting crew, a mattock man to dig the holes and a planter to set the trees. Carry the trees in a bucket so that the roots may be kept moist at all times.



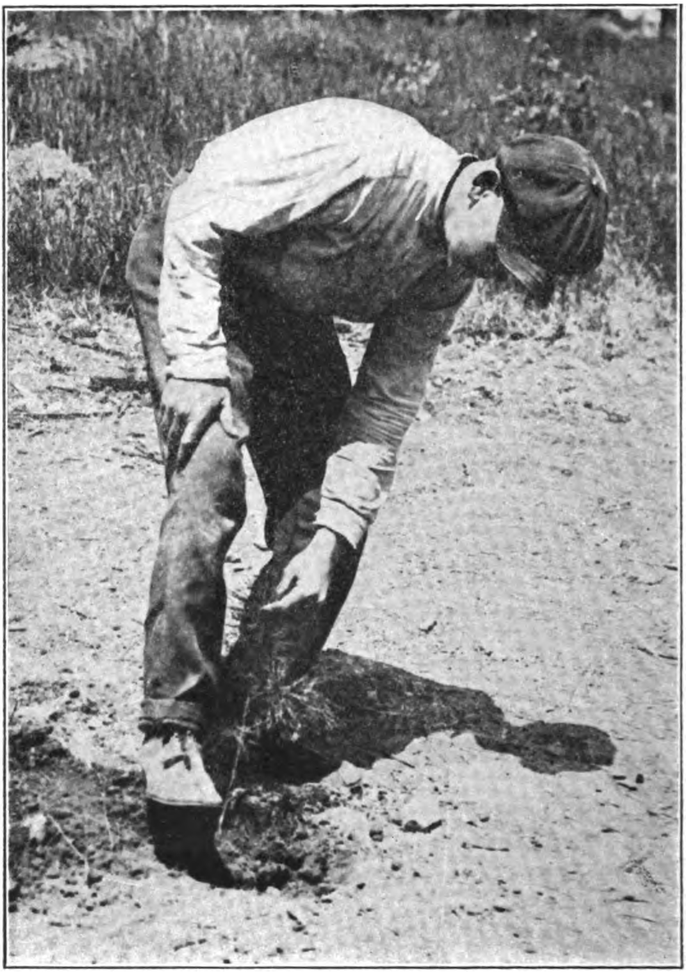
One stroke with the mattock will make a hole large enough to plant a tree. If the sod is heavy one square foot should be turned back with the mattock and a hole made in loose dirt.



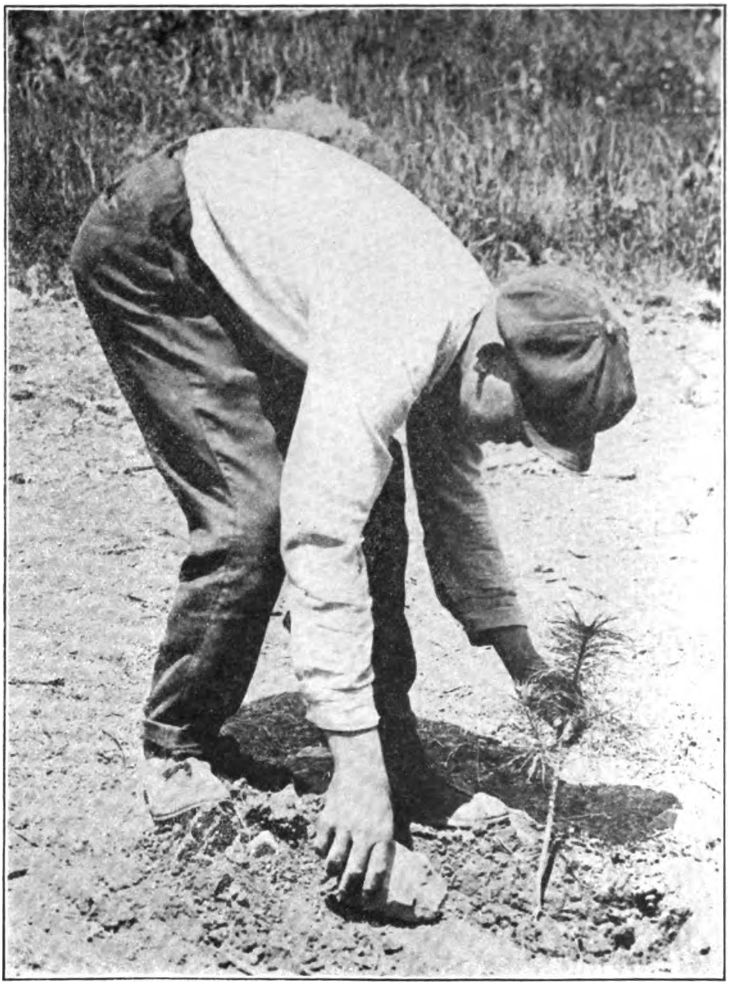
Loose dirt, carefully drawn to the edge of the hole, can be easily reached by the planter.



With his left hand, the planter sets the tree in a hole as deep as it was in the nursery. The roots should be spread out and loose earth pressed around them.



Loose dirt is packed firmly around the roots with the heel of the shoe.

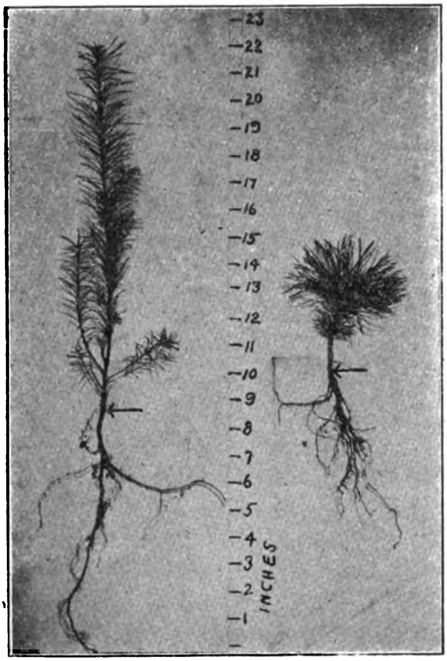


A stone is very effective in packing the dirt tightly around the roots.

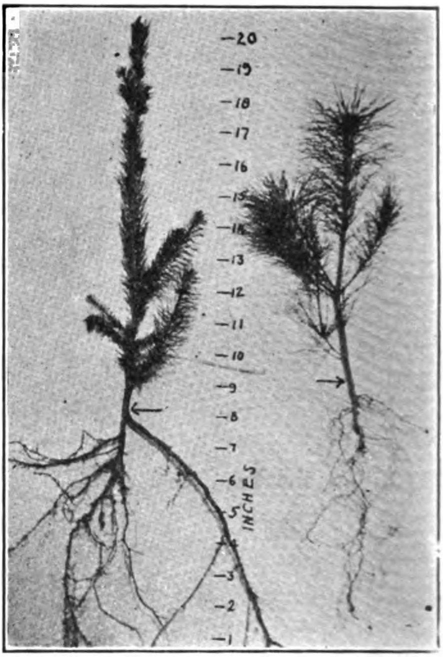
When properly planted the seedling will stand upright and be so firm that it cannot easily be pulled up.

Forest fires have devastated more than one-third of the forest area of Pennsylvania. Even a very light burning is sufficient to kill small trees. Hence fires must be kept out. On a farm this danger is usually slight, and little need be done except, possibly, the posting of a few forest fire notices. When a plantation is made near large wooded areas where fires are likely to occur, or if the plantation is large and destruction would involve heavy loss, special precautions should be taken. In addition to posting fire warnings, this can best be done by cutting fire lines or by putting on a patrol during dry seasons.

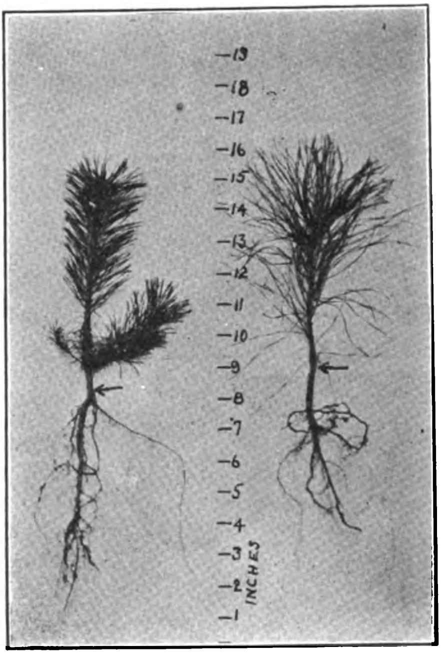
Livestock will eat the leaves and tender twigs of hardwood seedlings and root up, break, and tramp down small evergreens.



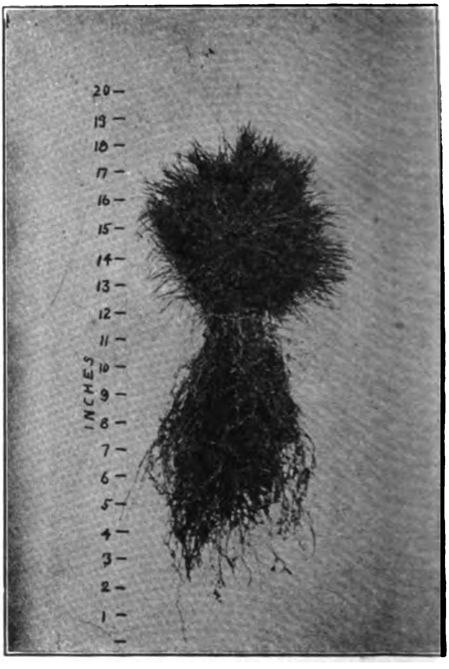
Japanese larch (left) and white pine (right), two years old.



Norway spruce (left) and white pine (right), three years old.



Pitch pine (left) and Scotch pine (right), two years old.



A bunch of 50 white pine seedlings, two years old, ready for packing and shipping.

One tree-planting enthusiast wrote: "I am planting for timber. It is better than bonds."

During the last twelve years, private planters have received from the Pennsylvania Department of Forestry 14,752,031 young forest trees which were set out in all parts of the State.

Twelve additional forest tree nurseries were started in the spring of 1921 at State institutions. The seedlings grown in those nurseries will be distributed free by the Pennsylvania Department of Forestry.

UNIV. OF CALIFORNIA

PROPERTY OF DIVISION OF FORESTRY
COLLEGE OF AGRICULTURE UNIVERSITY OF CALIFORNIA

Facts and F[illegible]es
on
Pennsylvania State Forests

Prevent Forest Fires
It Pays

August, 1921

Bulletin 22

Pennsylvania Department
of Forestry

Gifford Pinchot, Commissioner

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PENNSYLVANIA DEPARTMENT OF FORESTRY.

STATE FOREST COMMISSION.

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John W. Keller,
Chief, Bureau of Silviculture.
J. C. Arbogast,
Chief, Office of Maintenance.
A. O. Vorse,
Chief, Office of Information.
Joseph S. Illick,
Chief, Office of Research.
E. A. Zeigler,
Director, State Forest Academy.

UNIV. OF CALIFORNIA
PROPERTY OF DIVISION OF FORESTRY
UNIVERSITY OF CALIFORNIA COLLEGE OF AGRICULTURE

GOVERNOR SPROUL OUTLINES HIS FOREST POLICY.

Governor Sproul has made the restoration of Pennsylvania's timber production one of the fundamental policies of his administration. On July 30, 1920, he said:

"The Department of Forestry ought to have for fire protection alone very much more money than it now has for all purposes.

"Why not restore Penn's Woods? Why not let these mountains contribute once more as they have done in the past to the wealth, prosperity, and beauty of Pennsylvania?

"The first step is to put an end to the unmitigated curse of forest fire. The second is to take into the hands and under the protection of the Commonwealth, as soon as we can, the 5,000,000 acres of the Pennsylvania Desert.

"The purchase of additional State forests will be an investment, not an expense—an investment both sound and profitable. It will not only pay in the ordinary sense in returns upon the capital invested, but it will be a powerful means of securing to our people the supplies of timber—without which, under our form of civilization, there can be no assured prosperity. Nor can we overlook their value for conserving the health of our people, regulating the flow of our streams, and for out-door recreation.

"Never forget that if we fail to provide for our own needs in forest products no one else will do it for us. The very solemn fact is that if we fail to do so, neither in the other States of the Union, nor elsewhere in the whole world, shall we be able to secure what we need."

THE TIMBER SITUATION IN PENNSYLVANIA.

Wood is one of the few indispensable materials in modern life. Its increasing scarcity means not only higher cost of lumber but higher cost of construction, higher rents, and generally less comfort and well-being for the people of this State.

Civic and industrial organizations and the public generally realize that Pennsylvania must take prompt action to secure and restore her timber supply.

Pennsylvania uses annually about two and one-half billion board feet of lumber, of which the State produces only one-fifth, and is growing only one-third of that. The Pittsburgh district alone consumes more lumber than is produced in the whole State.

The situation will get worse until forest fires are checked, forest devastation stopped, and the young trees are given a chance to grow into timber.

Pennsylvania's annual loss due to the falling off in lumber production amounts to more than $100,000,000 a year—twice as much as it costs to run the State Government for a like period.

We pay at least $50,000,000 a year for lumber we import which we should produce at home; we pay more than $25,000,000 a year in freight on this lumber, which we should save. Through the closing of industries; through floods which could be prevented; and through the loss in fish, game, resort business, etc., we lose at least $25,000,000 more.

Lumber that could be purchased in 1885 at a Pennsylvania mill for $7.50 a thousand feet now costs $53.00 at an Oregon mill, and must be brought from Oregon or some equally distant point.

Pennsylvania is compelled to import seventy per cent. of her wood pulp. This raises the cost of newspapers and newspaper advertising.

The restoration of Pennsylvania's timber industry will mean the greatest material gain the State could make.

FIGURES ABOUT PENNSYLVANIA STATE FORESTS.

The original forest covered practically every acre of ground in Pennsylvania. More than 13 million acres are still classified as forest land, but about 5 millions are barren and unproductive. This is the Pennsylvania Desert.

The Department of Forestry began purchasing forest land in 1898. The total area of forest land owned by the State (June 1, 1921) was 1,125,611 acres. The average price paid per acre was $2.26.

Forestry is a business enterprise. A concise financial statement pertaining to the State Forests follows:

Total purchase price	$2,545,134.65
Total amount expended for administration, development, and improvement	4,702,155.96
Total investment and expenditures	$7,247,290.61
Estimated present value of forests	12,000,000.00
Total investment and expenditures	$7,247,290.61
Net gain on investment	$4,752,709.39

The Department of Forestry has paid for road, school and county taxes $616,040.17 to the counties in which the State Forests are located.

There are 43 Foresters and 87 Forest Rangers in the employ of the Department of Forestry.

There are 2,488 Forest Fire Wardens in the State who watch for and fight forest fires. These men are paid only when they are called upon to work.

There are 380 State-owned buildings on the State Forests, valued at $294,038.00.

Approximately 2,000 miles of forest boundaries have been surveyed, cleared and marked.

More than 4,000 miles of roads, trails and fire lines have been constructed and are being maintained.

During 1921, 525 temporary camping permits have been issued to 3,405 persons.

More than 600 leases for permanent camp sites have been issued

Eighteen steel fire look-out towers have been erected for the purpose of detecting forest fires, and four steel towers have been erected by the Anthracite Forest Protective Association.

Three forest tree nurseries are maintained by the Department of Forestry. They have a capacity of five to eight million trees each year.

A total of 34,216,727 trees have been planted on State Forests. The plantations now cover 22,410 acres.

During the last twelve years, private planters have received from the Department of Forestry 14,637,209 trees, which were set out in all parts of the State.

The State Forests comprise many of the best places to rest, finest fishing streams, best hunting grounds, and grandest views within the State.

DISTRICT, NUMBER, POST OFFICE AND NAME OF FORESTSER

District	*No.*	*Post Office*	*Forester*
Michaux	1	Fayetteville, No. 2	J. R. Williams
Buchanan	2	Everett	W. L. Byers
Tuscarora	3	Blain	H. E. Bryner
Rothrock	4	Mt. Union	Walter Leach
Logan	5	Petersburg	T. Roy Morton
Penn.	6	Milroy	W. J. Bartschat
Karoondinha	7	Mifflinburg	R. B. Winter
Bald Eagle	8	Lock Haven	B. D. McPherson
Moshannon	9	Clearfield	Wm. F. Dague
Sproul	10	Renovo	F. H. Dutlinger
Sinnemahoning	11	Driftwood	C. H. Hogeland
Tiadaghton	12	Williamsport (341 Pine St.)	H. S. Metzger
Elk	13	Sizerville	H. E. Elliott
Susquehannock	14	Coudersport	H. F. Port
Ole Bull	15	Cross Fork	J. E. Powers
Tioga	16	Wellsboro	P. H. Mulford

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DISTRICT, NUMBER, POST OFFICE AND NAME OF FORESTERS (Con.)

District	*No.*	*Post Office*	*Forester*
Valley Forge	17		
Weiser	18	Pottsville (207 N. Centre St.)	Chas. E. Baer
Delaware	19	Analomink, R. D.	R. W. Stadden
Wyoming	20	Dushore	A. F. Snyder
Lackawanna	21	Scranton (316 Wash. Ave.)	R. L. Emerick
Forbes	22	Ligonier	V. M. Bearer
Gallitzin	23	Johnstown	W. D. Ludwig
Kittanning	24	Clarion	C. E. Zerby
Cornplanter	25	Warren	H. B. Rowland
Mont Alto	26	Mont Alto	E. A. Ziegler

Prevent Forest Fires—It Pays

PENNSYLVANIA DEPARTMENT OF FORESTRY

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST COMMISSION

Gifford Pinchot, Commissioner of Forestry.

Edward Bailey.

Henry W. Shoemaker.

Mrs. John L. Lawrence.
(Mary Flynn Lawrence.)

Robert Y. Stuart, Deputy Commissioner of Forestry.

A. E. Rupp, Chief, Bureau of Lands.

Lewis E. Staley, Chief, Bureau of Operation.

George H. Wirt, Chief, Bureau of Protection.

John W. Keller, Chief, Bureau of Silviculture.

W. E. Montgomery, Chief, Office of Maintenance.

A. O. Vorse, Chief, Office of Information.

Joseph S. Illick, Chief, Office of Research.

E. A. Ziegler, Director, State Forest Academy.

Proceedings of

STATE FORESTERS' CONFERENCE.

SENATE CHAMBER, HARRISBURG, PA.

DECEMBER 8 AND 9, 1920.

PENNSYLVANIA DEPARTMENT OF FORESTRY

GIFFORD PINCHOT, COMMISSIONER.

Bulletin No. 23

1922.

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Senate Chamber,

Harrisburg, Pa., Wednesday morning,

December 8, 1920.

STATE FORESTERS' CONFERENCE.

The Honorable Gifford Pinchot presiding.

Mr. PINCHOT. The conference will please come to order.

I take very great pleasure, indeed, in presenting to you as the first speaker, and as the representative of the state of Pennsylvania, our governor. As you gentlemen doubtless all know, the recent progress of forestry in this state is directly due to the position Governor Sproul has taken in the matter, and the interest that he has shown. Consequently I present him to you, not only as the executive of our state, but as one first-class forester. (Applause.)

GOVERNOR WILLIAM C. SPROUL. Mr. Chairman and gentlemen: I am very glad to welcome you to Pennsylvania, and especially into this chamber of the senate. I feel that I have much more of a right to welcome people here after having served in this body for twenty-two years, than I have anywhere else in the state. I am glad that you are here and glad that you are here on the particular business for which you have come together. I regard it as one of the most important propositions that we have before us, and one so vital to the country that unless we give prompt attention, real attention, devoted attention to the problems surrounding it, we will find ourselves before long in a position that we will not only be uncomfortable, but will be really reprehensible and a great reflection upon the efficacy of a democratic government. Pennsylvania, as you all know, you know very much more about this subject than I do, Pennsylvania used to be a great lumber-producing state. Along in the fifties it led the entire country in the production of wood products; today it produces only a very small proportion of the amount that it uses, and that in spite of the fact that we have here in the center of the state and scattered throughout the state an area larger than the entire state of New Jersey, which is only valuable and only available for growing trees.

This state started a program of forest conservation quite early under Doctor Rothrock, who, bless his heart, is still here to see the progress of the work that he started. We began with a program in Pennsylvania many years ago, and we have made some progress. The state owns something over a million acres of land, and we have five or six million other acres which we have and which we propose to acquire just as soon as we possibly can. We reorganized our Department of Forestry and we were fortunate enough here in Pennsylvania to get a man who had the vision, and the energy, and the ambition, and desire to serve. It impels him to sacrifice his own leisure, which he is amply able to enjoy, and to come back into the public service and to give it his time and attention as he is doing. We were fortunately able to commandeer the services of Mr. Pinchot. (Applause.) I had to argue with him a little. There was not much that I could offer him in the way of attractiveness except in holding out to him the opportunity and the vision and let him see through my own eyes the vision that I had and to assure him of the hearty support and the cooperation of the state administration, something he did not believe he would get at the beginning, although he had no doubt regarding my own position; but he did not believe that the state was sufficiently aroused to the importance of the subject to make the things which he had in mind practicable or possible within a reasonable time limit. We have nine million people in Pennsylvania. We have big problems. We have a bigger country population, that is if you take out the one great city, or even taking out the two foremost, a greater population than any other state. New York has a population of ten million six hundred thousand, and of that number six million are in their great metropolis, leaving four million six hundred thousand in the state outside. We have over seven million in Pennsylvania outside of our great city. We have one hundred and sixty-five towns in the state of over five thousand population, and these places require help in this particular line.

This stream here in Harrisburg used to be the greatest rafting stream that the world ever knew. The amount of lumber that would come down, the amount that has been floated out of the Susquehanna would amaze us all if the real figures were presented. One of my predecessors, Governor Bigler, came down from Clearfield County, his home, to his duties at Harrisburg upon his own raft of logs, time and again, the easiest means of transportation over the hills and through the valleys of Pennsylvania I guess at that time. We are trying to make rural transportation easier. We are trying to make it possible for the people to get to these forests that we have. We have two hundred and sixty-five thousand acres of forest in one block up in the northern part of the state, and where within my recollection the bald hills were devastated by forest fires are now really creditable growths of new timber, which we are trying to protect. We are paying particular attention to this fire problem. In the past we have only played around the edges of that situation. The state would buy land and try to do something on it, and then either by carelessness or accident a forest-fire would come along and destroy not only all that had been done but render the ground fruitless for some time to come. We are going to battle with that problem in a better-organized way.

One of the things that I think is most important, and especially in view of the fact that all of our states are not so fortunate as Pennsylvania is in having land which is available for timber-growing in such large quantities as we have, one of the important things is that we have got a national forest program of some sort, a program which will not invade our rights or prerogatives. Goodness knows, we have had enough of that kind of business. The states have been ridden over considerably by various programs of national intervention in the past, but we can get a cooperative plan whereby the nation can help the states, and then we can help the national policy. If we do this we can help not only those states which are fortunate in having lumber, in having timber to preserve and protect, and conserve that which they have. I mean by conservation in that case, by providing a plan by which timber may be cut without destroying everything that there is for the present and for the future as well, that we may help those things which are not so located or have not the soil or conditions which will make them forest-growing states, and also help those states which are capable of reforestation to carry out their program and make them a great reservoir for timber in the future.

I hope that your deliberations here will be entirely successful and that much good will come of them. We are planning to do some real constructive things in our forests here in Pennsylvania, and I hope that the whole country will awaken to the necessity of doing this. We do not want this country to look like some of those lands over in the Orient, over in Asia, where the destruction of the forest has really meant the destruction of living conditions throughout those countries, the elimination of civilization almost. I believe it is almost that important. We want to go on here and take care of the state and make a great policy by which those who come after us may benefit by our foresight and our patriotic planning for the future. I really believe that it will have a great effect upon the whole life and development of our people. I am sure that we want to continue here to be real fine, clean-cut people, and not resolve ourselves into a nation of knotty buttcuts. I thank you. (Applause.)

Mr. PINCHOT. I told you he was a good forester, didn't I?

There is going to be up in the Department of Forestry tonight an informal smoker and we are going to have baked apples and ginger bread. If you find it possible to come over there and talk to these fellows I know they would enjoy it.

GOVERNOR SPROUL. Baked apples and ginger bread, why that sounds almost like old times.

Mr. PINCHOT. We should be very glad to have you come over.

GOVERNOR SPROUL. Well, if I do not get a better invitation in the meantime I will probably be around. (Laughter.)

Mr. PINCHOT. Gentlemen, I should like to hold the chair long enough to ask for nominations for a permanent chairman of this conference.

Mr. ALFRED GASKILL, State Forester, New Jersey. I believe that this group of foresters is very highly honored by the presence of the governor of one of the far western states. He has evidenced his interest in the forestry question by staying over from another weighty gathering to take part in this. I should like to name Governor Benjamin W. Olcott, of Oregon, as chairman.

Mr. PINCHOT. The chair declares the nominations closed.

Governor Benjamin W. Olcott was unanimously elected as chairman of the conference.

Mr. PINCHOT. Governor Olcott, will you kindly take the chair?

GOVERNOR BEN W. OLCOTT presiding.

The CHAIRMAN. I feel highly honored in being made your chairman. I feel, however, that an apology is rather due you on the arbitrary manner in which I was forced upon you by Mr. Pinchot. It is rather a misnomer to call me a forester, although there is no one in this room that is more interested in forestry than I. Out in our state the governor is ex-officio chairman of the state board of forestry, and in that manner I am a forester. We have seven members on that board; two of them are ex-officio, the chief executive and the dean of the state school of forestry.

Oregon, as you know, is one of the big timber states of the Union. I understand, at least we claim it, that Oregon today has more standing timber than any other state in the Union. It has one-fifth of the standing timber of the United States. It now stands third in the production of timber, and large manufacturers of timber products inform me that in their opinion it will soon occupy first place in the production of timber.

I came here to attend in a dual capacity, first the Governors' Conference which was held here December 1st, 2nd and 3rd, and to attend on behalf of the State Board of Forestry of Oregon this conference of state foresters. I am very frank to admit that I know little of forestry in its practical application, but I am very greatly interested in it. I might say that we are trying a little innovation out there in the way of patroling forest property, perhaps some of you have heard of it, which was inaugurated in 1919, and came about in a peculiar manner. With your permission I will just take a moment to tell of its origin.

We have an annual celebration out in Oregon, which is called the Rose Festival. To add a little pep to the occasion in 1919 the Air Service at San Francisco, under the control of Colonel H. H. Arnold, was requested to send up some planes, or "ships" as the aviators call them, to attend that festival. Airplanes at that time were not as common as they are now, hardly any one now looks up at an airplane, but at that time they aroused great interest, particularly in the northwest. We have large training fields in the west, particularly in California, for training aviators for war purposes, and their personnel remained intact. These planes came up from Mather field, which is twelve miles out of Sacramento, and for practically the first time crossed the Siskiyon Mountains, the Chinese wall which looms five thousand feet high between the states of California and Oregon, forming the northern boundary of California and the southern boundary of Oregon. The Rose Festival had extended me an invitation to ride with that caravan of ships from Salem to Portland, a distance of fifty miles. I had never ridden in an airplane, had no desire to ride in an airplane; I have three little babies at home, and two of them are twins, and that aspect loomed high on the horizon. The newspaper boys around the Capitol were continually asking me, "Mr. Olcott, what are you going to do with that invitation?" I always passed the buck. I made no definite answer. So the night before the planes were due to land in Salem, I had been out to a little party, and coming in about one o'clock, found a note on the telephone from one of the local newspaper boys, a good friend of mine, asking me to call him up, which I did. I might have known better, as he said, "What are you going to do about that airplane invitation? These people are due here tomorrow." This young lad had been a service boy. I said, "Dick, what would you do?" "What would I do? Why I would give my right arm and one hundred dollars in cash for your opportunity to ride tomorrow." I said, "Well, then, I guess I have got to be a good sport and go through with it. You can say I will accept it." When the planes landed I was there with my little family. They put me into a powerful plane and I thought that that was the last time I would ever greet my family. I arrived in Portland unharmed. I became well acquainted with the commanding officer, Colonel Watson, and the boys in charge during their few days' stay there. Colonel Watson, the last day of his stay, said, "Mr. Olcott, I think you rather enjoy flying. Let me take you back with me to Salem." I said, "Mrs. Olcott is the boss. I will ask her." Her reply was, "You can fly any place with Colonel Watson." So we started next morning for Salem. He didn't stop there but went on to Albany for lunch. Then he said, "You might as well go on down to Cottage Grove. We are going to stay there tonight." Arriving there he said, "Come on down to the California line." I was interested and went down.

That night in the hotel, he said, "I have a good scheme to suggest to you. Come on down and see Colonel Arnold, our boss. We have a little plan to propose to you." I said, "All right, if I can get out of the state without a telegram reaching me from Mrs. Olcott." When we reached Ashland we had to wait there because of the clouds and fog that enshrouded, surmounted the mountains. We had to lay over until noon to get over. I got out of the state all right. We landed at Mather field, and Colonel Arnold flew up from San Francisco to meet us. We there arranged to install if possible an airplane service for the fire protection of Oregon forests through the airplane system. As the result of that conference they sent up machines which operated in 1919. For 1920 we made extensive preparations. The government defrayed the expenses of this. The state was ready however to defray a certain amount, and as the result we got ten planes with headquarters in three points in Oregon. Last year the whole state was charted and cross-sectioned. The planes were rigged with wireless radio, and the moment the observer sighted a fire it was immediately wired into headquarters. The forest service now has the forests of Oregon pretty well lined with patrols, so it is not a hard task to at once see and reach the scenes of these fires. The airplane service in Oregon has been a success.

Mr. JOHN H. WALLACE, Jr., of Alabama. Mr. Chairman: I suggest that we proceed to elect a secretary of the conference, and I place in nomination the name of J. S. Holmes, of North Carolina.

Mr. J. S. HOLMES, State Forester of North Carolina. Mr. Chairman, I should prefer to see Mr. Stuart made secretary, he is more closely associated with the organization. I would like to nominate Mr. Stuart, of Pennsylvania.

Mr. WALLACE. I want to say the many qualifications of Dr. Holmes have been elaborately discussed and he has been agreed upon as the ideal man for the job.

Mr. STUART. If I may I should like to withdraw in favor of Mr. Holmes.

Mr. WALLACE. The name of Dr. Holmes, of North Carolina, is the only name before the house, and I move that nominations be closed and that Dr. Holmes be unanimously elected as secretary of the conference.

The motion was seconded and unanimously adopted.

The CHAIRMAN. In the organization, gentlemen, is there anything else that you feel needs attention at this time?

The next number on the program will be an address by Dr. J. T. Rothrock, of the Pennsylvania State Forest Commission. (Applause.)

Dr. J. T. ROTHROCK. To the gentlemen representing the forestry interests of other states: We are glad to welcome you here in order that we may receive from you the benefits of your experience in forest restoration, and also to offer you some facts which may have grown out of our efforts and which may be equally helpful to you.

In 1855 approximately large portions of the northern and northwestern counties of the state were in what might be called a forest condition. Splendid white pine and hemlock predominated in our evergreen silva, and in our hardwoods we had the oaks, the hickories, the beeches, the birches and the maples. I know that I am speaking the truth when I say to you that white pine, the old-fashioned cork white pine, sometimes attained a diameter of six feet or over. This I know from personal observation and measurement. That land had been sold out by the state originally, with all its wealth of timber upon it, for twenty-six and two-third cents an acre; and the state is glad today to purchase that same area back, deprived of its timber, at an average price of two dollars and forty cents an acre, in order that at least six million acres of land may be prevented from going into a desert condition. There are men living today who remember when the revenue to the state from those forests reached up almost to thirty million dollars annually, exclusive of the wages paid to the workmen. From the town of Clearfield north to the New York state line, a distance of about seventy miles, and from the mouth of the Sinnemahoning west to Warren, a distance of one hundred miles as the crow flies, was an almost unbroken wilderness of pine and hemlock. They have seen one-seventh of the state pass from a productive to an unproductive condition, and began to ask themselves "What is to be the ultimate outcome from such a policy?" In 1886 the Pennsylvania Forestry Association began its useful life. The act of 1893 called for the appointment of a commission to examine into and report upon the forest conditions of the state. The report of that commission was printed in 1895, and from that report grew a division of forestry in 1895 which was associated with the Department of Agriculture. That division of forestry, by legislative exactment, was subsequently elevated to the rank of a department, with equal and coordinate powers with the other established departments of the state. And it may be said that the first real progress in forestry in this state dated from the period when forestry was elevated to the rank of a department.

Whatever may be the relation of forestry to other states, it is clear that to this state it is of the first importance. It is second to no other interest here, a fact which is now being slowly recognized. It is safe to say that there are five hundred thousand acres of land which either are already abandoned or ought to be abandoned as farms on which agriculture has been, under old conditions, attempted and failed. That land should at once be returned to forests until increase of population and of fertility would restore it to production of food, for that demand will surely come. It is inevitable. Then in addition to this we have at least six or seven million acres with no known mineral contents, suited only to production of timber. On these facts I base my claim that forestry in Pennsylvania is a foundation interest on which our permanent prosperity must rest. I insist upon this claim because I think it is high time to call a halt upon the reckless appropriations of public moneys for purposes which are purely ornamental. I wish to offend no sensibilities, but I can not refrain, in order to give point to my statement, from saying that in this splendid building untold thousands of dollars have been expended upon gilt and glitter which might have been better spent in preventing the annual forest fires which burn up the wealth and productive power of the commonwealth. You can not rear a solid superstructure upon an insufficient foundation. The friends of forestry during a long period of agitation have been pleading for the very life of the state. Fortunately, the reaction has come, for the first time we have a governor who has in clarion tones told the people that forestry is to be one of the issues upon which he means to give character to his administration, and I say this without disparagement to the administrations that have within recent years gone before him.

There are counties in Pennsylvania that stand on the brink of bankruptcy because their only sources of wealth went with the timber which in imprudent haste they tore from their steep, poor hillsides. I commend this statement to the attention of those from other states who may have just such issues before them.

But there are other issues. Two legislatures turned down applications for small sums asked to clear up small, healthful areas on the state lands in order that a start might be made in inducing those of our population who were breaking down but not yet ill to go out and camp. It required no particular vision to recognize that the time was ripe for the movement. Of all the health-restoring resources at our command, pure, fresh air is not only the most effective, but it is also the cheapest and the most abundant. Permit me, gentlemen, to remind you that in the changes which are now shaping themselves in the public mind this is one of the things you must face and connect with your forestry issues. Grasping large areas by clubs and persons of wealth for exclusive purposes is near its limit. There must be outing grounds for the masses. Already there are thousands of camping permits given annually upon our state lands.

They are not only a help to the campers, but they make friends for the forestry movement. They become guardians of the public domain.

Upon our higher hills and mountain ranges there remains a vast water power unutilized. Growing scarcity of fuel is sure to call attention to it. Some of our important towns receive from these streams an abundant supply of pure water for the purpose of daily life, water which is above reproach, for there is no pollution above the heads.

But back of every proposition which I have stated in this conservative movement is the one source of all——the restoration and wise utilization of living, healthful productive forests on every acre of land which can not produce a better crop. There never will come a time when this statement can be denied.

We believe that state forestry here is in good condition. More than a million acres have been purchased by the state. We have a loyal band of workers in our forestry department and a human dynamo at the head of it. Our united efforts are heading straight toward the unpurchased acres which have not yet been placed under state control.

I should be unjust if I did not also call special attention to the morale and efficiency of our band of foresters, educated by the state for the care of state forests. If there exists anywhere a finer body of young public servants, I have not seen them. There is something in the idea of setting apart for state service a body of young men and educating them specifically for that. The idea was grasped by our government in founding its military and naval academies. A sort of fraternal relation grows up among those students which binds them firmly in the public interest. (Applause.)

The CHAIRMAN. We will now have an address by Colonel W. D. Greeley, of the United States Forest Service, on "The Nation in the National Forest Policy."

COLONEL W. B. GREELEY. Gentlemen of the conference: There is little argument among thoughtful men that provision for a continuous and sufficient supply of timber in the United States is one of the real economic problems which must be worked out by the present generation. Nor can there be much debate that sufficient timber for the future can be assured only by general reforestation of logged-off land. Three-fourths of our primeval forests are gone; and the United

States, like the nations of the Old World before it, must pass from the mining of virgin forests to the harvesting of grown timber crops. We are a people of timber users, and by one means or another we must become a people of timber growers.

Never before in the history of the United States has the need for reforestation been so widely recognized. It has been brought home to many American manufacturers by real shortages, not merely fluctuations of the market, in the valuable woods essential to their industries. It has been brought home to the newspaper publishers of the country through the shortage and high cost of print paper. It has been brought home, perhaps most acutely of all, to the million or more average citizens who want to build their own homes but have been unable to afford it. It has been brought home, no less, to forest industries which look ahead for a supply of raw material which will justify their investments in manufacturing plants and who realize that virgin timber is not much longer to be had. I have recently visited a large corporation in the south which has definitely embarked upon the reforestation of some three hundred thousand acres of southern pine lands, as they are cut, to afford a permanent supply of pulpwood for large paper plants after the virgin timber has been used up.

As a matter of fact, we are already using large quantities of second-growth timber. There are considerable areas in the South Atlantic states which are now yielding their third cutting of pine lumber. In our northern coniferous forests, holdings are not infrequent from which logs or pulpwood have been cut during three generations and which are still well-stocked timber lands. But the critical point in the whole situation is that, notwithstanding such instances as I have cited, the United States is taking timber from its forests three or four times as fast as timber is being grown. These few words put the problem in a nutshell. As against a steady shrinkage in the stocks of virgin timber, there are enormous acres of idle, logged-off land which are increasing by the millions of acres every year. Instead of haphazard second growth or no second growth at all, the nation must find some way to bring about plan-wise reforestation on all cut-over lands suited to timber growth, if its enconomic necessities are to be supplied adequately.

How shall this end be accomplished? Shall it be left entirely to economic forces, as many suggest,—to the law of supply and demand, to the enlightened self-interest of the forest owner who sees a profit or commercial advantage in reforestation; or shall reforestation be assured by recognizing squarely that forest lands have the nature of public utilities and hence that the public shall exercise a voice in their management and use?

The every-day incentives of business or personal interest will undoubtedly go part way in growing the timber which must be had to supply the requirements of this country. But they will only go part way. In the weighing of profits, enormous areas of timber-growing land would still be left idle. Furthermore, in many portions of the United States general reforestation is not possible without a large degree of public cooperation, indeed of public participation. Public aid must be had by the forest owners in controlling the high fire hazard attendant upon an inflammable investment which must be carried over a long period of time. Public aid must usually be had through an adjustment of taxation to the nature and growing period of forest crops. Farm crops would not be grown if they were taxed twice a week during the growing season. Nor can forest crops be generally grown if subject to the full burden of taxation thirty or forty times before they become marketable.

In the nature of things, therefore, reforestation can not be left wholly to private initiative, although every just and reasonable encouragement should be given the forest owner to utilize it as a business opportunity. The public must, from the very nature of forest properties, be an active participant. The public must put around forest lands the conditions which, by and large, will permit their owners to grow successive crops of trees, namely, reasonable security from forest fires, and taxation of the product when grown rather than of the product while growing. But the public should not and will not create those conditions favorable to reforestation unless it is assured that the forest owner makes good on his part, and that the land will actually be kept in the continuous production of timber which the public interest requires.

In other words, I am convinced that to get general, plan-wise reforestation we must recognize that forest lands are public utilities, that they are subject to such forms and degrees of public control as needed to keep them continuously in timber crops, and that under the broad theory of equitable compensation applicable to public utilities generally, forest lands must receive such just and special considerations as will enable their owner to obtain a reasonable return while complying with the requirements put upon him in the public interest. This give-and-take principle, I believe, must inspire our national forestry policy.

At the same time the public should approach the forest owner as far as possible in the spirit of assistance rather than of regulation. Every encouragement should be given to the forest owner, by education and practical demonstration, to reforest his land by the ways and means suited to his timber and his requirements. The well-tried incentives of competition and self-interest will accomplish much in reforestation, as in most economic movements. If any one doubts this, let him go to Urania, Louisiana, and see the splendid demonstration of reforestation on forty-five thousand acres, brought about through the foresightedness of a lumberman. Other examples could be cited a plenty in many different states. It should be the effort of the public to encourage just this sort of initiative, to give it wider opportunity and greater certainty of success, and to spread the gospel of reforestration by effective demonstration of its value. At the same time I believe that the public must clothe itself with the power and must exercise that power as need arises to see to it that no forest owner fails in keeping his land at work growing trees, once conditions are established which make that a reasonable undertaking on his part.

What role should the nation itself, through the federal government, play in reforestration? There is every reason why the federal government should do everything that it can do effectively. The timber supply problem is a national one. It can no more be restricted to the limits of a state or any other locality than our food supply, our coal supply, our railroads, or our marine transport. Our most densely populated industrial states are dependent upon other parts of the country for from sixty to ninety per cent of the forest products which they consume. The farmers of the prairie states, who require on an average two thousand feet of lumber per year on each farm for normal improvements and upkeep, are totally dependent upon sources of supply outside of their own states. Nor, is it a national problem solely because a small percentage of our forest products are consumed within the state where they are grown.

An assured supply of timber is a matter of national concern because it is vital to the standards and traditions of American life. Without it the homes we need to maintain the family life and environment, which is one of the most sacred of American institutions, can not be built. Without it the extension and improvements of our basic national industry, agriculture, will be critically handicapped. Without it many of our most distinctive manufacturing industries, like furniture making, and other industries of the most vital consequence, like our railroads, will sooner or later be seriously impaired. Reforestation is distinctly a matter of national concern, and the national government should do everything it can to accomplish it.

Through the vision of our leaders in conservation, chief among whom stand President Roosevelt and present Forest Commissioner of Pennsylvania, Gifford Pinchot, the federal government took the first definite step toward an assured supply of timber adequate for the needs of the country through the creation of National Forests. Every day demonstrates more clearly the wisdom of this step and the need for National Forest ownership on a much larger scale. For nearly twenty years the National Forests have represented the only large element of stability in the whole timber situation. They have been administered through successive political changes with unwavering adherence to the principles of continuous productivity of forest lands, a sustained yield of timber, and the protection of streamflow and other public interests. Furthermore, every National Forest is like a settlement house in a tenement district. It becomes a center of demonstration and practical education in forestry methods. Cooperative efforts among timberland owners for the prevention of forest fires grow up around it. In its demonstration of methods of cutting and growing timber, of disposing of fire-breeding slash, and of the actual costs and results of forest practice it carries conviction to the forest owners round about, where mere argument would be fruitless. It will be true in the United States as it has been in France and Sweden that a corps of publicly owned forests under technical public administration is the pivotal point in national progress toward the right use of forest lands.

As the virgin forests in private ownership are more and more widely depleted, the timbers of high quality like our old-growth white oak and yellow poplar, like the ship timbers sawn from virgin longleaf pine or Douglas fir, will become increasingly scarce and dear. The length of time required to produce such material by reforestation will largely preclude it as a feasible undertaking for the owner of private forest lands. This is an obligation to the industries of the country which the national government and the states may well assume, the production of highclass forest products requiring long periods of time, as it has been assumed by most of the governments of Europe. I know, for example, of no solution of our waning supply of old-growth hardwoods, which has become such a critical matter for many wood-using industries, so effective as large extension of publicly-owned forests in the hardwood region.

Every encouragement should be given to public forest ownership by our states, in line with the admirable steps already taken by such states as Pennsylvania, New York and Massachusetts. The field for public forest ownership is so vast that there is abundant opportunity for the maximum that both the states and the federal government can do. The United States contains eighty-odd million acres of idle forest land, whose original growth has been destroyed by logging or fire. Many of these areas can be restored to productive forests only by costly and artificial methods. We still have many watersheds upon which manufacturing centers depend for sources of power, or large communities for domestic water, or agricultural regions for irrigation, or inland waterways for navigability, upon which the protection of water sources is still left almost wholly to chance. There is no more well-tried, clear-cut responsibility which should be discharged by the federal government than the extension of the National Forests. I wish today that there were National Forests in the pineries of every one of our southern states. I doubt if any other single thing would more readily crystallize and carry forward the reforestation of that region, with its wanderful possibilities, or more effectively encourage the development of forestry work by the states themselves. I wish that we might have National Forests in every distinctive forest region of the country, in order that the federal government might, through the real test of of local forest ownership, exert direct leadership in the reforestation of that region.

It is impossible for the public to acquire all of the forest land in the United States. Four-fifths of our forests are in private ownership; and we must reckon definitely that the major part of our forest-growing lands will remain in private ownership. What is the responsibility of the national government as to these lands? Here as well the federal government should recognize its responsibility for doing everything in its power to meet the national need for timber; but we must recognize the practical limitations which determine what it can do effectively. As I have said before, we can not bring about general reforestation without recognizing that forest lands have the character of public utilities. That means two things: first, that the owner of the land must comply with certain standards fixed by public agencies for keeping his land in continuous production; and second, that the public shall create the conditions surrounding forest ownership which will make the discharge of its obligation to the public fair and equitable. The two must go together. Regulation and equitable assistance to forest owners must emanate from the same authority. Else the risk will be incurred either of a public gratuity to a certain class of land owners without compensating return or of public confiscation of their property.

To produce an adequate crop of timber on the average tract of forest land in the United States, three things must be done. First, the owner must be given an opportunity to obtain the benefit of a moderate tax while his crop of timber is being grown. Secondly, the owner must be protected from forest fires due to the negligence of his neighbor, either in leaving dangerous accumulations of slash or in failing to guard his land during dangerous seasons. He must be protected from the fire hazard created by railroads, campers or pedestrians, incendiarism, highway traffic, or any other of the thousand and one possible sources of danger. And third, he must in return for these specific measures of public assistance conform with equitable requirements as to cutting, slash disposal, and fire protection on his own land designed to keep it in timber growth. All three of these factors go together and must be administered together.

The power of taxation and the police powers upon which control of the forest fire hazard rests are definitely vested in the several states. It is hard for me to conceive of these powers being acquired or taken over by the federal government. Nor can I conceive of an effective scheme of reforestation under which these three integral and mutually essential functions of taxation, fire protection, and regulation are divided. The owner should not obtain the benefit of special forms of taxing timberland, designed to encourage reforestation, unless certain regulatory requirements are met. Fire protection and forest culture are so inextricably mingled as usually to be simply part and parcel of the same thing. In some sections, control of grazing is another fundamental of reforestation, leading us again into the field of local police authority.

In plain terms, I can not conceive of an effective scheme of reforestation under which its component parts are divided between the federal government and the states, with the national government, let us say, attempting to exercise regulatory powers while the state controls taxation and protection. Federal regulation of methods of cutting might readily enough be brought to naught unless completely and adequately supplemented by state laws and administration dealing with various phases of the fire hazard; or might readily enough become confiscatory if the laws of the particular state did not give the forest owner an opportunity to obtain an equitable taxation of growing timber crops. As a matter of fact, any authority on the part of the federal government to regulate the use of forest lands is shared by the states, an authority which the states are already excercising in certain instances. We would thus have the definite prospect of two sets of regulations, under state and under national enforcement, and not necessarily in agreement.

I have avoided purposely the constitutional aspects of this question because I am not competent to discuss them. It is my conviction that as a practical question of expediency, of getting results, and of carrying the United States forward to the stage where reforestation is the established order of things, federal control of private forest lands will not work. And I hold to this view particularly at the stage in our progress toward an assured and current supply of timber when, as at the present time, reforestation depends so largely upon a reduction in forest fires.

Let me fix your attention for a moment upon the two hundred and forty-five million acres of forest land in the United States which contain cull or second growth timber or which are more or less completely stocked with young trees. That is nearly double the acreage of our remaining virgin forests. A large part of it lies in our thickly populated industrial states, within a stone's throw of the large centers of timber consumption. These two hundred and forty-five million acres of second growth and young timber may well represent a forest asset of the United States of greater value than our remaining virgin forests, and upon their protection rests very largely our ability to bridge over the gap when virgin timber ceases to be an important factor in the yearly cut of forest products. The protection of these two hundred and forty-five million acres from fire is in my judgment the most important single forestry problem before the United States today.

When you add to that the necessity of protecting our remaining stands of old timber and our enormous areas of land logged-off and now being logged where protection alone will start young growth, it is difficult to place too much emphasis upon the importance of controlling forest fire as the first specific objective we set out to accomplish. Until the fire hazard has been brought under substantial control, regulation of cutting methods at the best will be ineffective and precarious. I am convinced, therefore, that the immediate form which public forestry efforts should take and the authority through which it acts should be such as will most effectively handle the forest fire problem. And this brings me again to the state as the governmental agency under whose authority the work must be done, because it is hard for me to conceive of the federal government assuming and exercising the police functions of our states dealing with the many phases of forest fires; and without such police powers no effort to control the forest fire problem will be successful.

At the same time fire prevention is not an end in itself. It is a means for the reforestation and safety of timber lands; and reforestation is the real objective which must never be lost sight of. We must have the kind of fire protection that will actually restock cutover lands and establish growing forests, as far as keeping out fire will do so. Success will be measured by the acres of growing forests which are actually established; and just as rapidly as the fire hazard is brought under reasonable control in this or that forest region, the steps in addition to keeping out fires which are necessary to put growing trees upon the land must be brought into play to the fullest extent that they are equitable to the forest owner. We must get before us this picture of reforestation as a whole; and we must work for its realization as a whole just as rapidly as each successive step can in the light of equity and common sense be taken. It is for this reason that I am opposed to limiting federal legislation and plans for federal cooperation to fire protection alone. Rather would I put before the nation as a whole, as one agency, and the people of each state, as a second agency, the goal of complete reforestation of lands not needed for other purposes with woods of economic value, and work toward that complete goal, step by step, as rapidly as we can.

I have said that it does not seem to me possible for the federal government to assume the regulation of private lands. I believe that this must be done by the states, as a practical matter of getting results, because the states control the other essential factors in the whole problem. What then should be the part of the national government in bringing about the reforestation of private lands? I believe that the nation can best lead this great movement, not by mandate, but by cooperation, by education, by fixing the requirements essential to reforestation in each region, and by encouraging their adoption. The federal government should be prepared to give general financial assistance to any state in protecting all sorts and conditions of its forest land from fire, once the state puts into effect the requirements upon forest owners which will make the joint protective effort effective. These should include fire-proofing logged-off lands or some effective control of the slash hazard. In other words, the states must adopt such regulatory measures as will make the federal funds expended a genuine investment in growing timber. I know of no better way to insure a future supply of timber for the prairie and industrial states than to invest federal funds in the protection of growing forests, north, south, and west, with such safeguards in the use of these funds as will actually make the protection effective.

The national government should not stop with fire protection. It should define and recommend to each state all of the steps essential to reforestation, including methods of cutting or extracting forest products, the equitable taxation of growing forests, and any other factors bearing upon the actual establishment of timber crops on all forest lands. It should make continued federal cooperation, from time to time, conditional upon the adoption of such regulations of private forest lands as are shown to be necessary and equitable under the conditions existing in that state. And it should aid the states liberally in the education of forest owners, in the demonstration of good forest practice, in reforestation, and in any special phases of the entire movement which the particular needs of any state call for.

It is far from my thought to assert that such a plan as I have outlined is the last word in our national forest policy. To me it is the most direct and practicable road to immediate results as represented by acres of growing forests. But whether state rather than federal control of private forest lands is the final word or not, I can see no reason why our states should not be encouraged to go just as far as they will in reforestation, or why any state that is prepared to impose restrictions upon its forest owner should not be given a clear field with the cooperation and advice of the federal government in doing so. Every local interest that can be aroused, every real development toward better forest practice that can be brought about through local agencies and local action, represents so much ground gained. Many of the states have established forest organizations which are accomplishing real results in reforestation. I do not believe that our national policy should discard these organizations, in preventing forest devastation or bringing about reforestation through any step which it may be possible for them to take. Nor, should our national policy discard co-operation with forest owners and forest industries in working out the practical problems of reforestation in each region. A policy of national cooperation with local agencies, working with and through our several states, will stimulate, in my judgment, the interest and support of all elements in the country which should take an active part in this movement, to the most effective degree.

Let me say further, that while I do not advocate federal control of private forest lands, because I question its practicability, I can not see that there is any inconsistency between federal control and the exercise of state jurisdiction in the same field; nor can I see how any plan of federal control that might ever be adopted could prevent the states from exercising such jurisdiction as they choose over their forest owners in the same particulars. We have got to recognize the right of each state at least to exercise jurisdiction over the lands within its own borders not inconsistent with federal law. Why not build that right with all of the local sentiment, the traditions of local self-government, the pride of local initiative which lie behind it, right into our national forest policy? Why not let the states go just as far as they will; and if federal control of forest lands is the ultimate answer, let it apply in those states which do not adequately handle the situation themselves. (Applause.)

Mr. PINCHOT. Just before the governor left he expressed his strong desire to meet all the members of the conference. Upon adjourning here we will pass over to his office at the other end of the building and give him that opportunity.

The CHAIRMAN. Everybody, I know, will be glad to meet Governor Sproul. I want to say just a word about Governor Sproul, and it comes from the heart. I first met him at the Salt Lake City conference last year. I spent ten days later with him going through the Yellowstone National Park. Mrs. Olcott and I fell in love with Mr. and Mrs. Sproul, as did every member of the Governors' conference. I consider Governor Sproul one of the very big men of this country, and I look forward to the day perhaps when Governor Sproul will be President of the United States. I want to say that he is a great big-hearted, whole-souled, capable, honest and sincere gentlemen, and I will carry back to Oregon only the most pleasant memories of Pennsylvania and of Governor and Mrs. Sproul, and of the fine complement of state officials that I have met in this beautiful city of Harrisburg.

At 12:10 o'clock P. M., the conference recessed until 2:00 o'clock P. M.

Senate Chamber,

Harrisburg, Pa., Wednesday afternoon,

December 8, 1920.

GOVERNOR BENJAMIN W. OLCOTT presiding.

The CHAIRMAN. We will now hear from Mr. J. G. Peters, of the United States Forest Service. (Applause.)

Mr. J. G. PETERS. Mr. Chairman and gentlemen: I don't know what Mr. Pinchot had against me that he should wish on me this subject of the organization of state forest work. It is just about as dry a subject as could be encountered; so if I do not succeed in making it interesting I want to engage in the popular American pastime of "passing the buck," and throw some of the blame on his shoulders.

Much has been said and written about the organization of state forest work. Perhaps too much has been said about mere organization and too little about forestry. By that I mean that possibly if we had kept forestry and all it stands for in the foreground we might be still farther advanced than we now are. Nevertheless it is far from my mind to minimize the progress which has been made during the scarcely twenty-five years' movement for the establishment of state forestry departments. But we must not lose sight of the fact that the departments and the legislation creating them are only means to an end, and that end is the woods part of the job of keeping forest lands productive, whether real forest lands or lands upon which it is not now economically possible to grow anything else but forests. Maybe if the public had been made to realize this to a greater extent than has been the case thus far, the proposal for federal control of private forest lands would not have been thought necessary by those who are advocating it. I think it was said by one of the governors who were meeting in this city last week that the reason for the tendency to turn to federal control of numerous activities usually handled by the states was because the state legislatures did not give the people what they wanted. On the other hand, is there not the possibility of the states resenting a wide expansion of federal control and of a reaction setting in towards the opposite extreme which might threaten the existence of well-established federal institutions as, for example, the National Forests themselves,

Be that as it may, there never was a time when strong state forestry departments were more needed than now. There never has been a better time than right now for the consumation of this desire. It is the public's fault where these departments are weak or entirely lacking. The public has been asleep, feeling secure as regards our timber supply in the thought that it was inexhaustible. Why worry ourselves about a state forestry department? Why add another penny to our mounting taxes? But during this period of inaction the sound of the ax has increased and the timber-supply bubble has burst as a result of high lumber prices and the publishing of information by the government and states on the inadequacy of our timber supplies, which culminated last June in the issuing of the so-called Capper report.

Evidences of an awakening are constantly being reported. In some states forest-land owners and lumbermen are willing to be taxed for the support of forestry work provided the forestry department is strengthened and made non-political; in some states, there is a desire to extend the department's work; in others, where no departments exist, there are strong manifestations of interest in their establishment along sound and efficient lines.

Forest organization has been adopted by no less than thirty-four of the states, and in a variety of forms. Seven states have selected the separate board or commission form, as in California, Maryland, Minnsota, New Hampshire, Oregon, Pennsylvania and Washington. Delaware also might be given credit for providing by law for a board of forestry, but with no funds to operate it. Seven states have combined forestry with a number of other activities under a conservation commission, as in Alabama, Indiana, Louisiana, Massachusetts, New Jersey, New York and Wisconsin; to this list might also be added Illinois, with its department of registration and education. Five have put forestry under the land department, as in Idaho, Maine, Michigan, Montana and South Dakota. Three states have placed forestry with or under the agricultural department, viz: Colorado, Kentucky and Vermont; three have located the state forester at the agricultural college, as in Kansas, North Dakota and Texas; two have provided for a state forester at the agricultural experimental station, as in Connecticut and Ohio. Three states have given their geological surveys state foresters, viz: North Carolina, Tennessee and Virginia; two have lodged full power in an individual forest commissioner, as in Iowa and Rhode Island; and one, West Virginia, has put forestry under the game and fish department.

In some instances it would seem as though, in a haste to have forestry recognized by the states, it has been disadvantageously placed in departments already established, perhaps of long standing, with the result almost invariably that it has failed of proper consideration and has become pocketed by reason of being overshadowed by other and older activities. Under such conditions it is extremely difficult to secure any appropriations beyond those for the barest necessities. I recall that in one state where the legislature was attacking the department as a whole, the state forester fought a lone fight for forestry without one bit of assistance from his chief, who claimed to be too much engaged in defending the other and longer-established work of the department. Could anything be more disheartening? Maine has proved the exception, for there forestry holds the distinction of having been attached in a very minor way in the beginning to the state land department, but by steady growth it now is by far the major activity.

Many states have objected to the establishment of additional boards or commissions so that it has become necessary to place forestry in an established department. This was the case in Texas, for example, and the legislature selected the agricultural and mechanical college as the place for the work. While an ideal location in many respects, including particularly the absence of politics, it has at the same time the disadvantage of offering obstacles to adequate appropriations for forestry, because of the large number of activities at the college for which funds are needed, so that forestry must take its chance, and sometimes a slim chance, along with the rest.

As an example of the vicissitudes of state forest organization, one has but to consider the action taken by Kentucky. In 1906 the Board of Agriculture, Forestry and Immigration was empowered to act as a forestry commission to further the interests of forestry and cooperate with federal forest officials; in 1912 the commission was superseded by a Board of Forestry which had authority to appoint a state forester, establish a forest fire protective system, and engage in other forest activities; six years later, this board with all its powers was consolidated with the geological board as a single-headed commission, and the state forester appointed commissioner of geology and forestry; and two years after that, in 1920, the commissioner was legislated out of office and forestry scrapped, except that as an afterthought the legislature of that great forest-producing commonwealth, realizing that there was some property left from the wreck which should be cared for, took the necessary steps to transfer this property to the custody of the Bureau of Agriculture, Labor and Statistics, and as an additional afterthought recreated the position of state forester and placed it also under that bureau. Is it, therefore, any surprise that the head of the bureau has not succeeded in filling the place after nearly a year, although the position pays a salary of three thousand dollars? Thus, since this bureau succeeded to the authority of the first-named Board of Agriculture, Forestry and Immigration, the merry-go-round was completed.

The last few years there has been a general tendency to combine forestry with other activities on the grounds chiefly of economy and of reducing the number of state department so as to bring them in closer touch with the executive. Thus, among the states which have effected the larger combinations are Alabama, which has combined forestry with the protection of game and fish, oysters and other shell-fish, and, as the law prescribes, "all other natural resources within the state, which have not been reduced to private ownership"; Illinois, where the state forester is placed under the department of registration and education, one of the nine large state departments; Indiana, which discontinued its board of forestry and combined forestry with geology, entomology, lands and waters, and fish and game; Kentucky, where, as mentioned above, the forestry board was discontinued and forestry placed with geology and later with agriculture; Louisiana, where forestry is combined with minerals, fish and game, and oysters and waterbottoms; Massachusetts, which has recently put forestry with fish and game, and animal husbandry, in one of the twenty state departments; Michigan, which abolished its forestry commission and created a public domain commission, with charge over public lands, forestry, fish and game, and immigration; New Jersey, where the forestry board was discontinued and forestry combined with geology, water resources, land registry, state parks, and the state museum; New York, which was among the first to change from a forest commission to a forest, fish and game commission, and later to a single-headed conservation commission having charge of forestry, water resources, and fish and game, in addition to one of the state parks; and Wisconsin, which did away with its forestry board and combined forestry with fish and game, and state parks. I have given these combinations in detail because it is interesting to see the variety of activities which have been brought together.

Entirely aside from the point of whether such combinations are the best in the interest of forestry, they have undoubtedly come to stay, and there will be similar combinations effected in other states. Therefore, it is well to recognize this and endeavor where the trend to consolidate seems inevitable to work out a satisfactory combination of departments dealing with the conservation of the state's natural resources. I remember a state forester once saying that he anticipated the movement in his state, and went about securing the combination of such departments as would not only merge satisfactorily with forestry, but would not reduce forestry to a condition of unimportance. This is a cue which all of us who are interested in the subject of state forest organization should take.

The advantages to be gained by combining forestry with other activities are worthy of consideration, but in any combination the interests of each are best served by independent direction. Thus, a combined forestry and game department should have a duly qualified forester in charge of the forestry work and a competent game specialist or biologist—a technical man—in charge of the game work, both directly responsible to an impartial commission or board of control. The mistake which has been made in at least one instance of leaving it to the department heads to settle the relative merits of the various needs, however, should be avoided, as this involves the giving of unbiased consideration to questions in which one's own work conflicts with that of others, which we may as well recognize as impossible. The results are friction and log-rolling.

It would be presumption on anyone's part to prescribe a single hard and fast formula for the states to follow in organizing their forestry departments. Moreover, it would not work. Nevertheless, I think you will agree with me that there is need for an ideal with which as a basis we can feel that we are traveling in the right direction. While we might differ as to details, we might agree as to the fundamental requirements of an effective forestry law, namely, that in a workable plan of organization provision must be made that will properly safeguard the work from political interference, and impose rigid requirements as to the qualifications of the man in charge. These can be most readily accomplished, certainly, by placing forestry in the hands of a department protected from outside interference by means of a continuing, non-partisan board or commission; that is to say, a body so organized that the terms of a majority of its members will not end in any one administration, and so constituted that those private interests which are more or less related to forestry should be represented, as well as the public, and that where necessary to include ex-officio members they should be limited to those who by reason of their positions can be counted upon to take interest in the board's activities.

Next in importance to effective organization and the elimination of politics is an adequate guarantee that the man appointed to direct the forestry work will be properly qualified. By all means he should be a technically trained forester, preferable a graduate of a forest school of recognized standing. In addition, he should have had sufficient experience in the practice of forestry to demonstrate his ability to handle the job. In this connection, the Texas law, for example, provides that the state forester "shall be a technically trained forester of not less than two years' experience in professional forestry work". If forestry is really to be undertaken, the natural and practical thing to do is to employ a forester to direct the work, and not a man whose training and experience have been along other lines. This does not mean that the executive in charge of administering the department of which forestry is a part need be a trained forester; in fact, it is better that he should not be a technical man at all, as experience both in our national and state governments has demonstrated.

But no matter how fine an organization may be provided, however, without funds it will not function. And this brings us to the matter of appropriations. The success of state forestry departments has generally varied directly with the amount of appropriation received. It is difficult to conceive of some of them ever receiving adequate funds as constituted or located at present. While the states' general treasuries are the source from which funds are usually obtained, the exceptions are worthy of note, viz: Louisiana, which levies a severance tax on the value of the stumpage cut; Maine, in the so-called forestry district in the northern part of the state, where a tax is placed on the value of the forest-land; and Oregon and Washington, which require the participation of private funds in the form of a patrol tax.

In conclusion, I wish to repeat with emphasis that the perfection of organization and the adequacy of funds are only the means to an end, namely, the practice of forestry in the woods. (Applause.)

The CHAIRMAN. It has been suggested that it would be a good idea to have a discussion of each paper as it comes up. Does anyone wish to discuss anything that Mr. Peters has referred to? I suppose you will answer questions, Mr. Peters?

Mr. PETERS. Yes, sir; if I can.

Mr. WILLIAM T. COX, State Forester, Minnesota. How many states now have what you would consider non-political forestry boards?

Mr. PETERS. By far the majority. The trend is decidedly away from political influence.

Mr. PINCHOT. I would like to ask a mean question. Would it be a fair thing to ask the men who are here whose work is free from political interference to hold up their hands, do you think?

About twelve members of the conference raised their hands.

Mr. PINCHOT. That is a fine showing.

Mr. JOHN H. WALLACE. The commissioner of conservation of Alabama enjoys the unique distinction of being the only officer of similar character in the United States who is elected by the people. It has been that way from the beginning, and permit me to throw a bouquet at myself, I have just been re-elected for the fifth time for a term of four years.

Mr. W. A. GUTHRIE, of Indiana. Mr. Chairman, I think Mr. Peters was a little misleading with reference to Indiana. To give a little history, in 1901 we passed the first forestry law. Governor Durbin appointed a board, and they elected a secretary. They functioned only as a political machine. I am sorry to say that happened under a Republican administration. The next four years Governor Hanly was elected, and he appointed the same secretary with the same results. When Governor Marshall came in he wanted a man that was efficient. He said if I would get the salary raised so Professor Thomas could afford to accept the place, also a Republican, but who was a qualified man. Some of you know him as having been connected with Wabash College. Thomas did not like to undertake the work of having the salary raised and the rest of us did not like to go before the Legislature to raise one's salary without his assistance. Governor Marshall then appointed a man who was a botanist and scientist, who devoted his time and energy to the forestry question. When Governor Ralston was elected, another Democrat, Governor Marshall said to him, "I do not care whom you appoint of my appointees, or whether you appoint them all, but there is one man I want you to retain and that is the man who is secretary of forestry, Mr. Deam." Governor Ralston said he would appoint Mr. Deam but the politicians played a trick on him. Mr. Deam was not a politician and did not care for the work anyway, so he was not re-appointed. When Governor Goodrich came into office he asked me to help him to form the forestry board. "Do you want efficiency or political service? I know of but one man in the state who would accept the office for the salary it carries and he happens to be of a different political faith than we are. I know he would be a very efficient man in this line. He loves the work, not for the salary but for the work he can accomplish." He said, "Well, name him and I will appoint him." That is my friend, Mr. Deam. He has been very competent and has done good work for the state, on forestry.

Two years ago the Legislature passed a law creating a Department of Conservation. In that department we have an efficient organization, but the forestry department is just as independent and more so than it ever was. We have a commissioner of forestry, who is Mr. Deam here, and who has full charge of all that work. He makes a written report and turns it over to our executive officers. Our director, four or five days before our meeting, goes over in detail his report and makes any suggestions that he feels like. Then the report with the director's recommendation is turned over to us. This commission is non-partisan. It is composed of two Democrates and two Republicans. It is made up of men in different lines of work. While, it has been less than two years, we are the only department, the only one in the state that never got any criticism during the heated campaign that we had this year. We were commended for the amount of work that we had done and for the amount of money that we have saved the state. Why? Because we have appointed some Democrats and some Republicans and there is no politics in it. They did work, they were efficient, and they delivered the goods and accomplished more than we had ever accomplished. The one thing that I want to correct Mr. Peters in, is that the department of forestry is as independent as it ever was.

The CHAIRMAN. If there are no further inquiries, we shall proceed with the next paper.

For the reason that a good many of the gentlemen will be going away tomorrow, it has been suggested that Mr. Pinchot's paper be presented how, rather than the last on the program tomorrow afternoon. So in accordance with that I will ask that Mr. Pinchot give his paper on "The States in the National Forest Policy."

HON. GIFFORD PINCHOT, Commissioner of Forestry, Harrisburg. Gentlemen, I do not know whether it has been as much satisfaction to all of you to see the old faces together again as it has been to me, but certainly it has carried me back very, very much to the old time. I want to say to begin with that if you other state foresters are enjoying your work and having as much fun out of it as I am, I think you are to be congratulated. I have had more fun in the last nine months than I have had since the year 1910, when I was removed from public office for the public good. It is great fun to get back into the harness and bite down again on the kind of work that I am good for, if I am good for anything.

I think perhaps the best thing I could do to begin with would be to run over very rapidly only the experiences that we have had in Pennsylvania recently in this forest matter. I will give you, as far as I understand them, the reasons which I think have led to the promise of success which faces us now.

Dr. Rothrock gave you this morning a brief resume of the history of forestry in Pennsylvania. What he did not tell you, and what I am mighty glad to be able to say in the presence of you state foresters, is that there is no other man in any state of the Union who has ever done for forestry in that state what Dr. Rothrock has done for forestry in this state of Pennsylvania. I think he is getting part of his reward on this earth, for a man over eighty years old who can come back and give the speech that he gave this morning, after having killed two deer in the state of Maine, this fall, deserves congratulation.

Dr. Rothrock is the father of forestry in Pennsylvania, but, for reasons which were not entirely separate from political consideration, Dr. Rothrock was unable to carry out and complete the work which he began. While he has always been associated with our forest department, there were many things which took place for which he was not responsible.

It is fair to say that the department is absolutely free from political influence. I know that in the only case where there was an effort made to bring political pressure to bear, the answer from the department was sufficiently direct and vigorous so that it has not been repeated. There is no politics in the Pennsylvania Department of Forestry whatever, but we do have the hearty support not only of the governor, but of the whole state organization, and that, of course, is one of the first reasons why things are going well.

When Major Stuart and I took charge of this work we found several essentials of success present. In the first place the Forest Commission, willing and able to understand the situation and to give us the support without which we could have done nothing. Secondly, a body of men in the forest department, such as, Mr. Rothrock said this morning, could not be surpassed, I think, by any similar body of public servants anywhere.

But we also found very serious deficiencies which amounted to giving us substantially a clean slate upon which our work could be written. For example, among the first things we had to do was to establish a system of accounts. There was no budget in the department. One of the next things was to establish a system of inspection. There was no inspection. One of the next things was to get ready to prepare fire plans for the individual forests. Others were to make a complete reorganization of the department so that responsibility was definitely assigned to men and to subjects; to bring forestry into the timber-cuttings; to establish a line of demarcation in timber sales between what the men in the field could do and what the men at Harrisburg had to do; and to arrange for practical advice in forestry to private owners, to enforce for the first time the law of 1915, which gives full power to compel protection against fire on private lands; and so on, and so on, and so on.

We had the opportunity, under laws, not in all respects satisfactory but still abundantly sufficient, and with appropriations sufficient at least in part for the work of this first year, we had the opportunity and the power to reconstruct the organization of the department and make it lean toward the side of efficiency, to lay down clear lines of responsibility, and so on, and especially give the men in the field the kind of responsibilty without which no good work is ever possible, the kind of responsibility which gives a man the chance to exercise the powers that are in him and secure recognition for the accomplishment when it is done.

That is the nearest outline of the foundation that had to be laid. You can not get anywhere, of course, without a sound and effective organization, or without men who know their business, unless you have that you are still in a situation where state work or national forest work must fail. So when we had gotten our department reorganized, divided up into definite bureaus, with definite duties for each, when we had succeeded in giving the men at least those who remained, (for we were obliged to get rid of some, in order to give a living salary to others), something approaching a living compensation, we had to give each man a man's-sized job so that he would be obliged to stretch himself to fill it. After we had given him good business methods to work with and a chance to show what was in him, still the success of the movement was not altogether insured. You cannot do anything without good work, but good work done does not always give you everything that you have got to have to win.

Beyond the work in the Department, we had to convince the state of Pennsylvania that the forest question was a big question instead of a little question. What little I know of work in forestry, either in the nation or in the state, leads me to believe that at the present stage of the development of public opinion here is the key to the whole situation. Forestry in Pennsylvania has not been moving ahead fast enough. When Dr. Rothrock tried and tried and tried for years in the most self-denying and unremittent way to get the people of the state of Pennsylvania to realize that it was a big question, he lacked the support from the outside which made it possible fully for him to succeed. He laid the foundation without which we could not be doing anything today. But his great work did not come at a time when it was possible for him or any other man to put over the conception of forestry which is now being instilled in the people of the state of Pennsylvania. In other words, if he did not do what now we hope to do with it, if he did not do alone what we now hope he will help us to do, it is well to remember that he did everything that could have been done under the circumstances, and more than seemed possible.

Now then, let me emphasize that again. Forestry in Pennsylvania was seen in the public eye as a small thing. The size of it was not understood, the effect of it on the welfare of the state was not understood. Pennsylvania was dealing with forestry on a dollar plane instead of on a hundred million dollar plane. That is an exaggeration of course, and yet that was the general point of view that the average citizen of Pennsylvania had of forestry. Am I not right, Doctor?

Dr. ROTHROCK. Yes, sir.

Mr. PINCHOT. It had to be taken away from that small conception and had to be put on a one-hundred-million-dollar basis, to use round figures. If we figure out what forest devastation in the state costs in money, we find something in the neighborhood of one hundred million dollars a year, which is almost twice what it costs to run the state government. It had to be taken out of the little and put into the big. As far as I am able to understand it, the common success at this present time in forestry, national and in the states, is due to the recognition of needs that are basic essentials. A man can not be a good citizen unless he has foresight and has courage. Forestry can not succeed unless we have a good organization and good men, but beyond that we must have a conception in the public mind that warrants a forester, in the public mind, in asking for big things because he is dealing with a big subject. Then having established (we have not done it in Pennsylvania, but we are making progress)—having established the idea that forestry is a really big question, not a part of the fish and game question, not a part of the water question, not a part of the land question, but one of the major divisions of the state's activities, supplying some of the major needs of the state's agriculture and industry, we have got to go ahead and present to the people of the state a perfectly concrete and definite plan. I am doubtless talking things that you gentlemen have all known for years, but the best I can do is to give you the way in which the thing has struck us and is being worked out here in the state of Pennsylvania.

The next thing then is a concrete plan. We have a concrete plan here which has been adopted by the governor, which is known as the governor's plan, and which goes at once back to what is our particular problem here, and asks for money to meet the situation. That is the first big question in forestry in Pennsylvania.

Pennsylvania is a deforested state. The Pittsburgh district alone is using more wood than is produced in the whole of Pennsylvania every year. Yet the natural reproduction is abundant. We do not need to plant on any considerable scale, but we have got to stop fires if there are to be any future forests in our state. Consequently the first item of our plan is to equip the forests of Pennsylvania against fire; that means, of course, as you know, not merely annual expenditures for fighting fire, but it means fire-control, fire-towers, telephones, roads, tools, organizations of citizens, volunteer fire-fighting organizations in the forest towns, complete fire-fighting plans for the various forests. For all that we are asking for one million dollars for the next two years. That is the first item of our policy.

The second, which was so well discussed by the governor this morning, is the acquisition of additional forest lands. We have now about one million one hundred thousand acres of state forests, and we want five million acres more. There is in the proposed new constitution authority for the issuance of bonds to the extent of twenty-five million dollars for the purchase of land. But that constitution may never pass, and if it does it will be years before it comes into effect. We can not wait for that; consequently we shall ask from the legislature such a sum of money for the purchase of land as the government can be made willing to approve.

How much that will be I do not know. I would like to make it five million dollars. That is what we ought to have, and especially because under Judge Woodruff's leadership we have succeeded in gathering together more data than has ever been collected before as to the remaining forest-lands of the state, as to what they can be bought for, as to where they are, and the rest of it.

We are ready to go ahead with these two plans for just as much money as the Legislature can be induced to give us. We hope for excellent results, and shall be greatly disappointed if we do not get a good deal more money for fire this year. If they do not give us that million dollars then we must persuade the people of the state, not merely that this is a big question, but that we have a definite plan to carry it out. We must persuade them that we are capable of handling the plan, of handling the money that will be given to us, that we have an organization that is efficient and progressive enough to make good in case the confidence of the Legislature and the opportunity to do the work is given to us.

Now, how are you going to get this ideal, this plan and this conviction of ability to handle the proposition to the people? There are two big ways, of course. The first that will occur to everyone is the press. We must approach the people of our state through the only available rapid means of reaching them, the newspapers; tell them what the situation is, and how big the thing is, and how much depends upon it. I think it is a fair thing to say that in the last nine months there have been more stories about forestry in the papers of Pennsylvania than in the previous nine years, and perhaps than in the whole previous history of the state. There has been a mass of it, and it has had an excellent effect.

The point that I want now to make to you is as to the method of getting publicity. You can give out, gentlemen, all the formal stories you like, and some of them will be printed in some of the metropolitan newspapers. Thus you get a certain amount of public attention. But the thing that will do most to put you where you ought to be in the public mind, with the proper amount of public spirit behind you, is the little bit of an item in the local paper. It is the little story that applies to the county or the town that counts. The localization of news, at any rate in a state like ours, is the secret of public support. Take this illustration: Mr. Vorse, a graduate of the Yale Forest School, who has charge of our publicity work, had handed to him one day a letter which went out from this department to all of the county commissioners of the state of Pennsylvania, to sixty-seven counties. That could have been handled in either one of two ways. It could have been given to the big newspapers as a letter written to all of the county commissioners, in which case none of the papers would have printed it, or practically none. Instead of that it was sent to the individual papers in the individual counties, and the caption was, "The Commissioner of Forestry writes a letter to the Commissioners of Lackawanna County," or Snyder County, or Washington County, and there was hardly a paper in the state of Pennsylvania that did not print it.

There is just the difference. One of the things that I have learned in this work, one of the things that I wanted to hand over to you most, was the value of this localization of your news. If it works with you as it works here in Pennsylvania you won't merely double, you will quintuple, or multiply fifteen times the amount of information that gets into the hands of the fellow that takes his shoes off and puts his feet on the other chair and reads his paper by the stove in the evening when his day's work is done. He is the fellow we want to reach. That is one way of putting the thing over.

The second way and one which is of enormous value also, it seems to me, in the formation of public sentiment and in the actual cooperation that you get, is in the method of dealing with the big commercial interests of the state. For example, not long ago, after I came in here, I called together the representatives of all the railroads of Pennsylvania, and laid my case before them. I said, "I have no law that will compel you fellows to build fire-lines, burn strips along your railroads, but it ought to be done, and here are the reasons." The result of it after an afternoon's conference, was that they agreed, wherever a railroad runs through a forest, to burn a strip one hundred feet wide from the outside rail along their tracks whenever they could first get the permission of the private owners to do it. They actually did it, and actually are doing it, and each spring that agreement will bring us nearer to the elimination of the greatest single case of forest fires.

That simple move gave us not only the cooperation of the railroads but it immediately had this other effect, that of persuading the railroad organizations that this forest question is worth their attention. The railroad corporations consider it a big thing instead of a little thing, and this same method has been used to persuade a great many owners, or organizations of timber-land owners, and so on.

We have succeeded in establishing in Pennsylvania among the Boy Scouts an organization known as the Forest Guides. Solon Parkes, of Reading, must be given the credit of being the inventor of this idea. These boys enlist, they are given a button by the department, they sign a pledge-card to prevent and put out forest-fires; to protect wild life; and get other people to do the same. We will have by spring ten thousand of them out of the twenty-odd thousand Boy Scouts of Pennsylvania. We will have whatever number it may be of boys scattered all over the state who understand, (and their fathers and mothers will come to understand also) that the forest fire question is really big.

This effort toward general public education has worked out, not only in the Legislature, but also in the woods. I do not know how it is with you, but with us a majority of the fires that are set, so far as I am able to estimate, are set on purpose. I can not prove that statement, but if it is not true it is pretty nearly true. The only way in which that can be reached effectively is not by prosecutions, but by creating such a public sentiment as to make public sentiment among the people of the state that will not stand for a man who sets a forest fire any more than it stands for a man who burns down a house.

Gradually from these various methods a public state of mind is going to be created. To a considerable extent it is already created so that it is felt. For example, we had last fall the driest October in twenty-eight years. Out of the one million one hundred thousand acres of state forests only one hundred and twenty-five acres were burned over, and the fires averaged only fifty-four acres in size. That to the smallest area per fire in the history of the department, which means that men were jumping on the fires more effectively than ever before. You get your response just as much in the woods as you do under a roof, and it pays enormously.

Nearly everbody is susceptible to these methods. Take another example. We have a law in Pennsylvania which was passed in 1915, which makes it a punishable offense for a man to maintain a fire nuisance. After the chief fire warden tells him it is a nuisance, if he does not abate it, he is liable to a one-hundred-dollar fine for every separate day it is maintained after notification. This law was a dead letter. It never had been enforced. We took it up with the big timber-land owners of the state, and it was amazing to see how quickly they came into camp and said: "Whatever you fellows say we ought to do we will do so far as we can."

There has been but one single case of a man coming back and telling us where we could go to before he would carry out our recommendations. In that case, before he could get, almost before I had written the letter which told him what I would do if he would not be good, notice came from his partners that they had, without consultation with him, carried out the instructions of the department.

Now, I have taken a great deal of your time in telling you about what we have tried to do in this state, because I enjoy talking about it, just as I enjoy immensely my association with the men with whom I have been working in this effort of the state of Pennsylvania in forestry. I want to repeat as the last thing, as it was the first thing that I said, that in my judgment the very bottom and foundation and origin of all successful forest movements in any state must be the taking of the forest question out of the class of little things and putting it among the big things. When we have done that it seems to me we have covered more than half of the whole road.

Now, I have taken a great deal more time than I intended, Mr. Chairman, but I would like to take ten minutes more with your permission. I want to take up another question, and like so many of the rest of you, I have a written speech. This is on the specific subject that was assigned to me, the matter of the place of the states in the national forest-policy. So I will read you briefly what I have to say. I have written it down not only because we were all requested to write papers, but because I want to say exactly what I want to say.

Public opinion is just awakening to the vital need for the practice of forestry on private timberlands held for commercial purposes. This awakening, far more purposeful and wide-spread than the similar stirring of public opinion which made it possible to secure the Natonal Forests, offers by far the most promising opportunity for progress in American forestry within my experience. There is clearly before us the chance for greater advance, an advance which may even extend within the next decade to the point of assuring a permanent and sufficient supply of American forest products.

The chance is here, but we have not yet made use of it. We must crystallize this invaluable public opinion behind a policy wide enough and strong enough to make us independent for good and all of timber supplies from other countries. Our success in doing so will depend on two or three essentials in the policy behind which the forces of forest conservation elect to throw their strength. The first of these is that we must work with and not against the underlying trend of the times. The second is that we must present to Congress with which the decision has, a policy which can be passed, and which, when passed will produce results. The policy we decide on must be submitted for the approval of Congress; a national body whose members are necessarily governed not only by the interests of the nation at large, but more particularly by the interests of the individual states which they represent.

The essential facts in the lumber situation so far as the selection of a national forest policy is concerned are three—first, the United States is not self-supporting in timber, but is consuming its forest capital four times faster than that capital is being renewed; second, not only timber but the productive capacity of timberlands is being destroyed; third, the great majority of the states are unable to supply their own needs for wood, but must rely upon the forest resources of other states. Therefore, the agriculture and industries of most of the states are dependent for their essential supplies of lumber on forests outside of their own boundaries. As to a majority of our commonwealths, this condition will be permanent.

It may be taken as basic, therefore, that the majority of the states, containing a large majority of the American people, will be permanently dependent for their prosperity on timber supplies produced outside of the boundaries of the states in which they are consumed. That being so, the balance of power in Congress as between the forested and the deforested or unforested states is a consideration of vital importance in the formulation, and still more in the enactment, of a national forest policy.

Entirely apart from partisan consideration, certain facts as to the recent election have great importance in this regard—we have all heard rumors that there was an election not long ago. On March 4th next the weight of power in our government will pass from the states that are predominantly exporters of lumber to the states that are predominantly importers of lumber; from a group of states whose principal business, aside from agriculture, is lumbering to a group of states whose principal business, aside from agriculture, is manufacturing.

Under the new order, therefore, the states whose vital industries depend on lumber grown in other states will hold the balance of power. Of the states which have just gone Republican, more than three-quarters are importers of wood. Moreover, the chairmanships of the committees on agriculture and appropriations in House and Senate are and will be held by men from lumber-importing states—not only so, but the great majority of the members of each committee is and will be from states whose industries would perish without lumber from beyond their own borders.

What is true of the membership of these two committees is true of Congress as a whole. In the consideration of what can or can not, as well as what should or should not, be included in a forest policy for the whole nation, these facts obviously require consideration.

Two forms of national forest policy for preventing forest devastation are before the country for consideration—one that of direct national control—the other that of state control under national persuasion. I want to be considered very thoroughly in what I am about to say now as a state forester, for I am speaking not only from my interest in forestry in the state of Pennsylvania, and because I want certain help for this state from the federal government.

The Forest Service plan has been embodied in an item to be submitted to the House committee on agriculture as a proposed part of the coming agricultural bill. With all that part of this item which has to do with cooperation between the states and the nation for the control of fire, for the promotion of planting, and for forest-investigation, we are all agreed. With that part of it which assigns to the states control over forest devastation, some of us profoundly disagree.

Let me make my position entirely clear.

First, I welcome any and every action by an individual state to prevent forest devastation.

Second, I have confidence in the technical and executive capacity of state foresters as a body, and complete reliance upon their devotion to their work.

Third, I am for national control, because in my judgment it is the only form of control that can actually be secured, and the only form that, if secured, can be effectively enforced. Only national control will guarantee uniformity of treatment among all those to whom it is applied, or will assure protection to the vital interests of all the wood-using people of all the states.

Fourth, I am for and shall whole-heartedly support all that part of the proposed Forest Service appropriation item which does not assign control of forest devastation to the states. For that purpose, I have already asked to be heard before the house and senate agricultural committees. By the way, I want to say that under the new order, I did not know it until yesterday, in Washington all the appropriations for the forestry department in the House will come before the appropriation committee instead of before the agriculture committee; therefore I assume that this item will follow that course, but if I find that this is so I shall ask to be heard before the House committee on appropriations, and shall, before those committees and in all other ways, do my best to secure the appropriation of a million dollars for national cooperation with the states in fire-protection, planting, and forest investigation. At the same time, I shall, if necessary, ask to substitute for the few words whose effort is to assign control over forest devastation, and hand over the timber supply of the whole nation, to the individual timber-exporting states, some such wording as the following: "And the secretary of agriculture, where and to the extent necessary to insure a future timber supply to the American people, may, under the rules and regulations to be prescribed by him, require the owners of timber lands held for commercial purposes upon the watersheds of navigable streams, when such lands are valuable only or mainly for timber production, to refrain from destroying the capacity thereof to produce trees." I make this statement with full understanding that an item in an appropriation bill is valid for only one year. But to adopt it might well be taken, and would certainly be claimed, to be the adoption of the state-control policy by the national Congress. The precedent is dangerous. In my opinion, the words which carry state control should be eliminated.

Except that rumors to the contrary have reached me, it would seem unnecessary for me to say that this position of mine is not based on hostility to the Service, or to any part of its policy except state-control. It would seem unnecessary to repeat that no one has a profounder feeling of interest, affection and respect for the Service, or more cause for it, than I. The best years of my life were given to it; I helped it grow from very small beginnings to its present nation-wide importance. Since I left it, no call to defend its interests or promote its welfare has ever gone unanswered so far as I know. A father is not charged with coldness or disloyalty to his child when he points out an erring tendency. No more should I.

As I have said times out of mind, there is no better body of public servants anywhere on earth than the men and women of the Forest Service; no better work has ever been done for the government and the people of the United States than the Service has performed; no more difficult and delicate task was ever approached with finer spirit, wider knowledge or greater devotion than the task which faced Colonel Graves when he succeeded to the leadership of the Service; the work of Forest Service men in the world war, at home and abroad, is the source of infinite pride and gratitude to every American; under the vigorous and energetic leadership of Colonel Greeley, I wish the Service every success. But I reserve and shall exercise, now and always, the right of independent judgment as to whether or not, in any given case, the policy of the Service is right or wrong. In the present instance I believe it is to the interest of the nation, of the Forest Service, and the forest organization of the various states and very much to the interest of the whole, that the nation rather than a few timber-exporting states should control forest devastation and our future wood supply, and so believing I can do nothing less than give expression to my belief.

Moreover, the reasons given above, together with my own experience with Congress, and a special investigation of the present position of congressional leaders, have convinced me as to the attitude Congress will assume. I have said a good many times in print that in my judgment it would be impossible to secure from this Congress, or from any Congress in the near future, the enactment of the state-control policy either in an appropriation bill or in any other form of bill. In order to be absolutely certain of my ground in this matter, I went to Washington and talked the thing over with a number of the leaders who have been known for a great many years, and satisfied myself as well as I was able in the short time I was there as to what the actual situation was. I talked with Mr. Montell, not directly on this question, but as to the situation in the matter of appropriations, and found him more impressed than I have for a good many years with the absolute necessity for retrenchment. Mr. Montell, who was pretty close to being the father of the reclamation act, told me that he had already notified the men of the west who had come to him on the subject that there would be no direct appropriations for that purpose this year. Talking then with men on the committees of agriculture and appropriations of both House and Senate, I came back entirely convinced.

I came back with definite knowledge where before I only had a conviction that so far as Congress is concerned any effort to secure either in this item or anywhere else, either at this session or any session in the future, a form of words which would authorize the inauguration of a state-control policy would fail. I want to make that thing very clear, because it would have been unfortunate for me to emphasize a statement of that kind and to have found afterwards it was unjustified. All these things together have, I think, given me a clear conception of what the attitude of Congress will be. It is perfectly obvious that an effort to place in the hands of the forested states—which within ten years means in the hands of the Legislatures of Washington, Oregon and California—the decision as to the future timber supply of states more numerous, more populous, and more largely represented in Congress, is foredoomed to fail.

Colonel Greeley himself has told us repeatedly that he does not intend to give immediate effect to that part of the proposed appropriation item which deals with the control of forest devastation. There can be, therefore, no immediate need for that part of the language which some of us can not support and which in any event leaders in Congress will not permit to pass. You gentlemen understand, of course, that any new language in the appropriation bill is subject to a point of order by one man and that the man who makes the point of order is not required to give any reasons for doing so. He simply says, "Mr. Speaker I object," and designates whatever new language he objects to, and that language goes out. There is, therefore, in my judgment no chance of this particular language remaining in this bill.

But even if I am entirely mistaken in my estimate of the facts and their meaning still the question arises whether it would not be wiser for us state foresters as a body to unite behind what we are all for, the million-dollar appropriation for fire, planting and investigation. In that event, the single point upon which we disagree would be left to be settled independently at a time and in a way such that the inevitable objections of Congressmen and Senators from timber-importing states would run no risk of endangering what we are unanimously agreed on.

I want this money for Pennsylvania just as much as any of you fellows want it for your own state. We were saved from a very uncomfortable situation to a considerable extent last spring by the seventy-five hundred dollars that Mr. Peters was finally persuaded, against his better judgment, to put into the state of Pennsylvania, and we are very grateful for it. We want more money, and we want it just as much as any of you, because in relation to the vast forest-area of the state we are probably in a good deal worse situation than any of you. I doubt if there is anybody here that has any more, except possibly Michigan, than five million acres of completely devastated lands within the boundaries of the state. We want our full share of that Federal money for planting, for forest investigation, for fires, and, so far as the Lord lets us, we Pennsylvanians will stand behind the movement as long as the rest of you fellows to get the money for that purpose.

But I have had long enough experience in Congress to know this, that in the final days of the session, and some of you who have had legislative experience will be able to support me in this statement, in the final days of the session, at the time when appropriations go through, the rush is so great that the opportunity for fine distinctions disappears, and the chance that the whole item will go out because some one individual phrase in it is objected to is multiplied many times.

It looks to me, if my estimate of the situation in Congress is right, as if the state foresters were in a position, if the state-control item is insisted on, in which they will automatically prevent the full appropriation in which they are interested. It is always a risky thing to put a new policy into an appropriation bill subject to a point of order. It is merely to invite failure to put it into an appropriation bill subject to a point of order at a time when it is known in advance that influential leaders of both House and Senate will see to it that it goes out. Now, I want the money as much as you do, and if we can all get together behind that part that we all are for, I think we have a chance to get it, and if not we will not get it. (Applause.)

Mr. WALLACE. I am sure I have been highly entertained and edified by the magnificent address of Mr. Pinchot. He and I are old friends and have known each other for twenty years. I want to ask him what would be the effect of the language of which he speaks in the matter of protecting or securing surrounding timber on water-sheds. Now, take the state of Alabama and make it an example. The state of Alabama is a great lumber-producing state, a great yellow-pine belt there. Now, I want to know how that would effect the people of Alabama.

Mr. PINCHOT. As to what the working out of the policy would be?

Mr. WALLACE. How would that affect us.

Mr. PINCHOT. I do not know whether you have seen a report made by the Society of American Foresters. That is precisely what I have in mind.

Mr. WALLACE. Yes, I have read that.

Mr. PINCHOT. As to this language, I know, of course, very well indeed, that no such language will pass in the present appropriation bill. I merely suggest substituting one point of view for another. This matter has been fought out for a number of years. We have just finished, as some of you gentlemen know, a fifteen-year fight to save the coal-lands, to save the oil-lands, and in each case we won. In the last session of Congress the fight was finished to save the water-power. In each case we have passed through the regular series of phases, first, no control: second, state control; third, national control, and in each case national control has won out. There will be no legislation on this subject on either side of the house for several years. It is one of the biggest questions that can come before the people of the United States, and it will have to be threshed out at every stage.

Mr. WALLACE. Mr. Pinchot, would that language which you have suggested there in your admirable address, would that contemplate government control of private property?

Mr. PINCHOT. Yes, it would be exactly analagous, for example, to government control of private property by the Interstate Commerce Commission.

Mr. WALLACE. There would be no such thing as condemnation for public use without adequate compensation?

Mr. PINCHOT. The Interstate Commerce Commission regulates the railroads in Pennsylvania and the state gives them police protection. Under the plan I have in mind the states would protect from fire. The state taxes the railroads of Pennsylvania, and under the plan I have indicated the state would tax forests. The Interstate Commerce Commission, a national body, regulates the use and handling of private property just as under the plan I have in mind the government through the Department of Agriculture and the Forest Service in particular would regulate the use and handling of commercially held timber-land so far as they have correlation to interstate commerce. It would be analogous in both cases, an interference with private property rights for the public good.

The CHAIRMAN. The question is open for discussion. Would anybody like to make any inquiry of Mr. Pinchot regarding the essentials of his paper?

Mr. WOODRUFF. As I listened I heard the word "forest devastation" several times, and for fear that forest devastation might be misunderstood I would ask Mr. Pinchot if by any chance he would include in that, as speaking of devastation, the devastation of forest by fire.

Mr. PINCHOT. My judgment is that forest fires are a state question; taxing is a state question; but the destruction of timber-lands by the cutting of timber is a national question.

Mr. WOODRUFF. When you say forest devastation you refer to timber cutting?

Mr. PINCHOT. I do.

Mr. W. A. GUTHRIE, Chairman Conservation Commission Indiana. May I ask a personal question that pertains to our own State's interest? We have the enthusiasm, and I know the outgoing governor is going to recommend it, and I am satisfied the incoming governor will recommend it, an appropriation for buying this cut over timber-land without a survey. How is the best plan, for us to buy this? Our state contains 22,400,000 acres of which it is estimated about 800,000 acres in the southern part of the state to be water sheds of the Ohio river. Two to four hundred thousand acres that are suitable for growing timber, but that is all divided up into various farms and small lots. How are we going to buy it? What kind of a law can we pass to reach that, I think that our forester suggested a long time bond proposition, but I am informed by attorneys that we can not do that under our constitution. What kind of appropriations do we need to make available to get this timber for the state?

Mr. PINCHOT. I can not tell you how to do it, but I shall be mighty glad to tell you what we are doing. In the first place, we get once in two years an appropriation from the legislature for the purchase of forest lands. For this present two years it amounts to one hundred and thirty thousand dollars, but in no case are we to pay more than ten dollars an acre. What we do is to ascertain where in the state we can get two things together, land that ought to be in a state forest, and land at a reasonable price.

I do not need to tell you gentlemen that the fact that the state has some money to spend is a perfectly good reason in the minds of a great many why the state ought to pay two prices for what the other fellow has to sell. It all has to be handled with a great deal of care, but can be handled in such a way as to get full value for the state.

Judge Woodruff has sent letters to fifteen hundred land-owners throughout the state of Pennsylvania telling them of what the forest department has in mind, and asking them to send in offers. They make those offers on a regular form, and in a great many cases we take an option.

Mr. GUTHRIE. In small amounts which don't hitch up together?

Mr. PINCHOT. That, of course, is your trouble. What we are doing here is to take up pieces of land wherever they happen to be, even if they are not contiguous to state forests, provided we know in advance that the area in which these particular pieces of land lie is ultimately likely to fall within our five million acres. We are very sure that all these lands that we buy will never be worth any less than they are now, and if the state does not want them, if it holds them for ten years and does not want them, it can sell them and make a large profit on them.

Mr. GUTHRIE. We have the right of eminent domain, but we do not use it.

Mr. PINCHOT. We have the right of eminent domain also, but we do not use it, because it costs too much. We can buy the land cheaper without it. The only place in which we propose to use it is where there are difficulties in the title which can only be cleared up in that way; and in those cases we shall, so far as possible, make a definite agreement with the owners of the land in advance as to the price. I do not know whether I have answered your question at all, sir; but I have tried,

Mr. GUTHRIE. In a way.

The CHAIRMAN. If there is nothing further, we will proceed with the symposium. The subject is, "Our timber needs and supplies." The subject has been divided into five sections, New England, the South, Middle West, the Lake States and the West. The first will be represented by Mr. W. G. Hastings, of Vermont.

Mr. W. G. HASTINGS. State Forester, Vermont. There was no intimation concerning the length of time I should occupy so I have prepared only a two or three-minute paper, feeling that the rest of you probably would do the same, and in that way combined we would occupy perhaps half an hour.

New England is a forest region. Notwithstanding her industrial and agricultural enterprises, her population, her wealth and culture, and her three centuries of development, New England, by the edict of her physical geography, still remains a wild-land region, and will continue to be a region where wild lands predominate until a political, economic and social order has been created in which agriculture is profitable without the use of farm machinery, an impossible time. New England passed her heyday as a rural community sixty years ago, and since then the edge of the woods has drawn nearer and nearer to New York.

Of the slightly less than forty million acres comprising the land surface of New England, fully three-fourths is unsuited to a higher use than timber-production, and of this three-fourths about ninety per cent. is capable of producing forest-growth. The remainder is the natural barrens. Expressed in acres, there are about three and one-half million acres of barrens, including swamp and water; ten and one-half million acres of pasturage or land devoted to higher use, and twenty-eight million acres of wild land capable of supporting timber-growth. We have not twenty-eight million acres of productive forest, however. Estimates made by the several foresters of New England, if I can harmonize their statements correctly, show that this area of twenty-eight million acres may be divided into three equal or nearly equal parts, namely: first, lands supporting a satisfactory stand of timber containing trees of merchantable size in dominating percentages of volume; second, forest lands supporting a satisfactory stand of young timber: and third, forest lands supporting an unsatisfactory stand of timber, either young or old, or no timber at all.

The first class, containing nine million acres of mature, or nearly mature, pulpwood and saw-timber, includes within itself the infinitesimal amount of virgin forest left standing in the region, and includes also all other stands of timber of merchantable size. Except for these virgin stands of a million acres or so, every stand of saw-timber in New England has been more or less heavily culled for the better classes of material. These culled stands are, therefore, made up of inferior species and poor specimens of good species. At best the timber is culled stuff cruising from five to six thousand feet per acre. These nine million acres of culled-over, mature or nearly mature stands occupy twenty-two per cent of the area of New England, or thirty-three per cent of our absolute forest soil capable of producing forest growth, and support all of the pulpwood and saw-timber in New England variously estimated at fifty billion feet. In calling the timber on these nine million acres, a satisfactory stand, there is no desire to convey the idea that the stand is in any respect all that may be desired, and least of all is it satisfactory from the point of view of volume. Such a classification simply means that there is volume enough present to insure that lumbermen will return for another cut.

The second of the three nine-million-acre classes of forest land into which our forests of New England may be divided contains, as expressed above, a satisfactory stand of young growth not yet sufficiently aged to be considered merchantable for either saw-timber or pulpwood. This second class is the severely cut-over lands which, in spite of fires and other misuse, is restocking to desirable species in varying degrees of perfection. The area contains large quantities of cordwood stumpage as well as reproduction of both hardwood and softwood species. In speaking of the condition of this class as satisfactory there is no desire, as expressed above, to convey the impression that the stand as a whole is entirely satisfactory.

The third class, the nine million acres of land supporting neither timber nor reproduction, or supporting worthless stands of either or both, this third class of forest land is the man-made, desolate wastes, and includes the twice-burned-over hillsides, the rough, remote abandoned farms, and forest lands too recently or too severely cut over to determine what the future stand is to be, if any. These, together with the natural barrens, are the lands which have arrested the attention of the casual observer, and which bear physical evidence of the serious condition our forests are in.

New England contains one-eighth of her original stand of timber; her merchantable forest-area has shrunk to one-fourth of its original acreage; her forests are called upon to supply two and four-tenth billion feet of timber yearly in the form of lumber, pulpwood, ties, posts and cordwood, according to the "Capper Report," while the same report places the yearly increment at one and three-tenth billion feet. A generation ago she was a heavy exporter of timber; today she is an importer of one-third of all timber consumed in her industries and building trades; she is paying more to the already overtaxed railroads in freight rates than it will cost to maintain her forests in a producing state equal to the needs of the region. The forest wealth of New England has shriveled almost to the vanishing point and continues to shrivel. Our forests are at present in a deplorable condition, but the situation, serious as it may be, is not hopeless to those of us who are optimistically inclined. There still is time to repair the havoc that has been wrought in our forests. A regulation period of fifty years, the careful expenditure of a few cents per acre the services of one hundred well-trained foresters and one thousand rangers will bring our forests back to normal.

Dr. ROTHROCK. What about insect depredation in the New England states?

Mr. HASTINGS. Insect depredation in the southern portion of New Hampshire and Vermont, I refer to the southern portion of New England because the spruce belt of Maine extends considerably farther north, and in the southern portion it is not as noticable as it is farther north. There is depredation both in New Hampshire and Vermont of common knowledge to us all, but the insect trouble that arises in Maine I have not seen, and I can not, therefore, speak authoritively on it.

Dr. ROTHROCK. I was recently informed by a man in the state of Maine that in four of the townships in northern Maine an examination had been made on the condition of the spruce and fir, and that they had reported that from eighty to ninety per cent in certain districts was absolutely gone. A lumberman of very wide experience in that region made a remark to me that in regard to the spruce so far as the northern part of Maine was concerned, they were at the end of their long timber lumbering.

Mr. HASTINGS. I think it has been stated by those who are in a position to know, surely I am not in a position to contradict, that the spruce bud worm has done more damage in northern New England and Quebec than fire.

Dr. ROTHROCK. In the forest that I saw, practically every good sized spruce tree was dead or dying, it was the most hopeless situation that I ever saw. The young spruce outside where the clearings were made seemed to be in relatively good condition.

The CHAIRMAN. The next speaker is the gentleman from the sunny South, **Mr. John H. Wallace, Jr.**

Mr. JOHN H. WALLACE, Jr., Commissioner of Conservation, Alabama. Governor Olcott and gentlemen: I am very sure that I voice the sentiment of every gentleman present who is a forester when I say that we are delighted to be in Pennsylvania, and we are especially happy to be in Harrisburg, and we are beatified beyond the scale and bliss of dreams of being in this magnificent capitol which is one the most wonderful pieces of architecture it has ever been my pleasure to gaze upon. We are happy to be in a state which has given to the nation the Honorable Gifford Pinchot, who will go down in history as one of the greatest conservationists of the country.

The subject assigned to me is the timber-supply of the South and its needs. I do not know that I can say much speaking for Virginia or North Carolina, because there are two admirable, estimable gentlemen here who are more familiar with conditions in those states than I am; Mr. Jones, of Virginia, and Dr. Holmes, of North Carolina. I am especially familiar, however, with the pine-belt, the long-leaf or yellow-pine belt. Strange as it might seem to you, the South is still a wilderness, that is with reference to forest lands. There is but a very small percentage of the land cleared. There is still standing in the South a magnificent growth of long-leaf or yellow pine. It is true that some fifty-odd years ago the matter of the exploitation of the timber resources was begun, and that due to this in many sections of that fair and wonderful land desolation and despair has been left in the wake. There is in the south the reserve supply of long-leaf pine of the American continent. The mills during the period of the war worked overtime and produced enormous quantities of lumber which they sold for very handsome prices. Now, since the price has gone off, they are not cutting timber so rapidly. We export from Alabama and from the South, I suspect, ten times as much lumber as we consume. It has been estimated that with the supply of long-leaf pine left in the South and that together with some short-leaf pine or loblolly pine which is left remaining, standing in primeval forests, enough of that pine to last from twelve to fifteen years, and in some of the larger holdings probably from twenty to twenty-five years. Now, there is also in the South large quantities of hardwood like the oaks, for quarter-sawing; they make beautiful furniture out of it, take the hickory and make spokes and handles out of it. There is the cypress, also the gum. There are still considerable quantities of that there, but in the South, just as it has been in New England and New York and Pennsylvania, the crying need of adequate legislation to save the forests from absolute obliteration never appealed to the people until those forests are about to disappear from the face of the earth. It is true with reference to the South as it has been in every part of the country, there is growing in the South millions of acres of second-growth pine. Now, there should be laws passed by various states which contemplate something like this, that is—now just a moment—the men who own that pine-land upon which that second-growth timber is growing do not feel able to hold it for thirty or forty years until it reaches maturity. Now, that is the point here. Now, what has got to be done? We must pass a law providing that the states can enter into a contract with individuals owing such land to grow timber on it and exempt it from taxation until the time that timber is ready to be cut, and then impose a severance tax at the time of cutting, or otherwise participate in the profits to be derived from that timber. Now, that is a practicable and feasible plan. When we do that there will be millions of acres of land in the South that can be exempted from taxation and upon which timber can be grown. As I see it, that proposition is workable all over the United States. For instance, there was a law passed by the last legislature of Alabama providing for a ten-cent tax on every ton of coal mined in the state. They said it was unconstitutional. They went into court, and the supreme court has upheld it. That is directly in line with the surface tax in the matter of cutting timber trees; but, as Mr. Peters most admirably said in his address this morning, or rather this afternoon, and as Colonel Greeley stated this morning, that the individual who enters into that contract with the state must absolutely agree to grow timber on it, and the state in return must see to it that it is protected from the ravages of forest fire. I can safely say that with the timber in sight in Alabama, the actual existing timber, and the second-growth timber about to ripen and coming on to ripen year after year in the state, that there is still in sight in the South timber to last the people not only of the South, but all other parts of the country as well, at least fifty years.

The CHAIRMAN. Are there any inquiries to be directed to Mr. Wallace?

The middle west will be represented by Mr. Edmond Secrest, of Ohio.

Mr. EDMOND SECREST of Ohio, Gentlemen: Ohio was among the foremost states in the production of hardwood timber. The original stand is estimated to have contained approximately 170 billion feet, which covered some 90% of the total land area. The present forest area of 3,200,000 acres contains approximately 10 billion feet of all classes of timber. Of this amount first quality virgin saw material will not exceed 1 billion feet.

The inherent forest lands of the state located in the south-eastern quarter, approximately 1,000,000 acres contain second growth hardwood stands in large tracts of considerable potential value, but the merchantable saw-timber is of negligible quantity. While this section, will in a large part produce the future forest products of the state, it will require at least 50 years with intensive protection against fire to produce saw-timber, much of which will be of relatively inferior quality, because of the cumulative injury by fire, and other forms of devastation.

The remaining 2,000,000 acres of forest land are more or less a part of the better agricultural districts of the state and they contain the great bulk of the remaining stands of old growth. Many of these farm woodlands exist on soils of greater or less agricultural value. They are not menaced by fire, but 84% are heavily grazed, and the young growth is nil or of inferior quality. The practice of grazing has produced a change in forest conditions which is responsible for the rapid deterioration of the old growth. The total increment in the heavily grazed woodland is small, and since some 1,750,000 acres of Ohio's farm woodlands are grazed the annual growth for the state is low. It probably will not exceed 25 board feet per acre. This not only portends serious consequences in respect to future timber supplies, but we find ourselves in the position where the great bulk of the remaining old growth timber is contained in woodlands which for the most part exist on agricultural soils. This condition will tend to jeopardize the present available reserves, because the woodlands are not only subject to the devastating influences of heavy grazing, but are being cleared for tillage and grazing in a manner which does not take into account the economical utilization of the timber. Up until a few years before the European war, when stumpage values were comparatively low, saw logs of more inferior quality were disposed of by methods much the same as those employed by the early pioneers.

The situation affecting the wood-using industries of Ohio is acute. Owing to the superior quality of oak, poplar, hickory, and walnut the state has been one of the foremost in the number and output of its hardwood manufacturing establishments. For a number of years this industry flourished, and in addition Ohio exported considerable quantities of hardwood lumber. Today the industries remaining, import at least 75% of the raw wood material used. During the past decade many of the smaller plants have gone out of business or moved elsewhere, owing to the exhaustion of the timber within reasonable distances.

There is a distinct feeling of uneasiness among the larger users of wood. The following quotation is from a letter written by the head of a large box company in Ohio, which is quite representative of the attitude of the industries using hardwoods. "We desire to take this opportunity of urging that something definite be done in regard to reforestation in Ohio. We have some very decided opinions upon this subject, and have been in a position to see and appreciate just what the depletion of our woodlands mean to the future generations, and even to these men living in the present.

"This plant will be obliged to close within two years for lack of timber. Basswood is practically extinct. We are today the only factory in Ohio making berry baskets, the third largest in the United States. Next season we shall have to cease the manufacture of basswood berry baskets and use maple. Had the state taken hold of this problem even 20 years ago, berry growers would not have to send to the South next year for berry packages."

The same condition exists in the industries using hickory and ash. Yellow poplar formerly used extensively for house siding is now rarely employed for the purpose There is little No. 1 poplar standing in Ohio woodlands today.

The stumpage values of Ohio timber have doubled during the past decade. In some cases prices paid in 1917 and 1918 had increased three fold over those of 1913. Instances are on record where ash stumpage was sold for $75.00 per thousand. Transactions where $40.00 to $65.00 were paid were quite common. White oak No. 1 logs brought from $30.00 to $55.00 per thousand stumpage. Values have decreased somewhat since 1918 in sympathy with the general slump in the hardwood market. There is at the present time, in fact, very little stumpage moving, but prices have held up remarkably well.

Good roads, accessibility, close proximity to the manufacturing points are responsible for high stumpage prices in Ohio. The annual cut in Ohio is 250,000,000 board feet. We consume annually approximately 1,750,000,000 board feet, or seven times more than we cut.

The CHAIRMAN. The next gentleman is from the Lake States, Mr. C. L. Harrington.

Mr. C. L. HARRINGTON, Commissioner of Conservation, Wisconsin, Gentlemen: I assume that the Lake States include Minnesota, Wisconsin and Michigan. Being personally acquainted with the situation in Wisconsin, I will discuss it first.

Now, what have we by way of a timber supply in Wisconsin at the present time? Wisconsin embraces about thirty-five million acres. About eighteen million acres lie in the southern part of the state, and today it is a large agricultural region. It has a generally rolling topography; becoming somewhat rough in the southwestern part of the state, but can not be considered as any thing but an agricultural section, where one farm abuts right up against the other. Our timber supply can be found to a certain extent in this eighteen or nineteen million acres in the way of farmers' woodlots, and today we know that there is a considerable supply of very good maple and basswood, some oak, and a considerable amount of walnut, and the general hardwoods cut from the farmers' woodlots in southern Wisconsin.

Northern Wisconsin has about sixteen million acres which include about thirty counties. Of this sixteen million acres ten million acres are cut over for the most part. At the present time about four million acres are in farms and the balance of two to two and a half million acres is in forests. These timber stands would run from five to eight thousand feet, probably average about seven thousand feet. At the present time Wisconsin cuts something over a billion feet of timber a year. We have upwards of three hundred saw mills working in the state; that is, taking the entire state. We have probably fifty mills that would be considered good, big mills located in northern Wisconsin. There is upwards of twenty-five billion feet of lumber standing in Wisconsin at the present time, and there are a number of the larger mills which have cuts of from fifteen to twenty-five years ahead of them. Now, this timber is made up almost entirely of hemlock, birch, maple, elm and the general hardwoods. In other words, the supply of timber at the present time in Wisconsin consists chiefly of mixed hardwoods and hemlock with a certain amount of white pine and Norway pine scattered in here and there. There are very few stands of white pine left in the state.

As to the timber supply of the future it is problematic just where it is coming from, so far as Wisconsin is concerned. We are a flat land state, relatively speaking. In northern Wisconsin and to a certain extent in the central part of the state, we know of approximately three million acres of land which because of low fertility could be classed as forest land. Now, over two million acres of these lands there is a big question mark today as to whether they are going to be agricultural lands or forest lands, and for the remaining two million acres we can say with a good deal of assurance that eventually they are going to be used for timber production. Even in our most highly developed counties along the south Wisconsin border we find from ten to thirty per cent of the land still remaining in timber growth, as farmers' woodlots. When passing by on the train or traveling over these counties by auto one often gets the impression that they are pretty well wooded on account of one woodlot succeeding the other, or one stand of timber succeeding the other right across the country. So, all told, Wisconsin is pretty well provided for at the present time so far as timber is concerned, and the probabilities are that twenty or thirty years from now, unless something unusual happens, and unless the big agriculture momentum which is so pronounced in Wisconsin at the present time is modified, Wisconsin will have to look to other states for the bulk of the forest products she yearly requires.

Concerning the needs of Wisconsin at the present time, let me say we have a great number of wood-using industries within the state. I believe we rank third in the matter of paper and pulp-production in the Union. We have large furniture factories, sash and door establishments and excelsior mills of considerable size, and about ten years ago Wisconsin in her wood-using industries was using up a billion feet of forest products. That does not include saw mills nor does it take into account the stocks and the sales of retail yards located in nearly every settled town and hamlet in the state; nor materials going into mines. Even though we are large users of wood products at the present, I believe that board for board, Wisconsin still cuts enough annually to supply her needs. This situation of course is rapidly changing. As the years go by there is no question in my mind but that a great many of these woodusing industries are going to pass from the state or go out of business. We know that the big saw mill is going to pass. We know that a considerable number of the short-lived industries, like heading mills, barrel and stave and small box establishments will move out. It will be a considerable number of years before the paper and pulp mills will cease operation. We find them extending out in every direction. At the present time spruce bolts are rafted across Lake Superior from the north shore of Minnesota or over from the Canadian shore, and yet that was unthought of eight or nine years ago.

It is pretty hard to tell just what the ultimate needs of Wisconsin are going to be in regard to forest products. Wisconsin is going to have a big rural population. The large areas of potentially fertile and valuable soils of the undeveloped sections of the state and the great enthusiasm for agricultural development at the present time indicate very clearly as to Wisconsin becoming a great agricultural and industrial state. As such she will need large quantities of forest products in the future and it is my belief that we in Wisconsin have practically passed for all time into the class of timber-importing rather than timber-exporting states. I am not very well acquainted with the general circumstances in Michigan and Minnesota. I think Michigan is a good deal in the same position today as Wisconsin as regarding her timber supplies and needs. I know that there are vast quantities of hemlock and hardwoods in northern Michigan. I think Minnesota is probably more favorably situated than either of the other two states. As far as I know, she is more faverably situated so far as timber supplies are concerned. I think of the three states that Wisconsin has less land that could be classed as forest land. I think that on some of the lands that I have been over in Minnesota there is no question as to its adaptability for forests and nothing else. It seems to me that Minnesota and possibly Michigan—I am not very well acquainted there—are left a much better opportunity in the long run to grow the timber they need than Wisconsin.

The CHAIRMAN. The west will be represented by Mr. W. J. Morrell, State Forester, Colorado.

Mr. W. J. MORRELL, State Forester Colorado. Mr. Chairman and gentlemen: I am from out where the West begins. The chief representative of the West who will respond for the West, our chairman, the governor of Oregon is very much where the West leaves off. The next stopping-point is the Far East. It is only through the courtesy of the old chief, Mr. Pinchot, that I am assigned a place on this program, because the thought came only this afternoon to him, and it is especially fitting that the West should be represented by a governor, especially a governor from Oregon, possibly from the city of which the following story is told. The city council of Salem once wrote to the council of an ancient city in Massachusetts suggesting that it was inconvenient and inadvisable that two important cities in the United States should be named Salem, and the city council of Salem, Oregon, suggested that Salem, Massachusetts, change its name. The West is not noted for modesty, and it is particularly fitting that the response for the West should be given by no less a personage than a governor. It would be a crime for me to mar this flow of eloquence which we have heard here today, and so I think I shall give my time to the Governor of Oregon, unless there are some specific questions which any of you might desire to ask concerning conditions in Colorado, which, by the way, is not a great timber-producing state, for as you know its forests are chiefly valuable as protective forests, maintaining the beauty of our summer resorts, our mountains, and to maintain our supply of irrigation water. However, I am gratified at the honor shown Colorado and to myself for this privilege of giving my time to the governor, who will represent the West.

Mr. ALFRED GASKILL, State Forester, New Jersey, in the chair.

The CHAIRMAN. The conference is waiting, I am sure, to hear from the governor of Oregon.

GOVERNOR OLCOTT. Gentlemen, this takes me unawares. I knew nothing of this, but a little later on I may have something to say about our problems out there and the conditions surrounding, but the gentleman from Colorado's mention of the West's modesty is a true story, and it might interest you to know the facts behind it, if you have not read of it—about the little town of Salem, Oregon, eighteen thousand people, asking the large town of Salem, Massachusetts, to step off the deck and give the Salem of the West the privilege of the sole, exclusive control over that name. The absurdity of it is shown by the fact that Salem, Massachusetts, as everybody knows, is the old witch-craft town of the early history of our country. The inside story is that the Salem, Oregon, Chamber of Commerce, which has for the size of the town quite an active organization, lost their secretary. They temporarily put in a young chap of about eighteen years of age, just graduated from high school and business college, and he, like a good many of us at that age, thought he was some pumpkins. The older I get the more I realize the little I know. I remember when I came out of business college I returned to my home in Illinois and attempted to show my father how to keep his books. He was an old New England business man, and you know how far I got with that. But at any rate this young chap thought it was not more than right that Salem, Oregon, possessing all the beauty claimed for it, should have the exclusive use of the name, so he wrote the Chamber of Commerce of Salem, Massachusetts, asking them to renege absolutely on the name. It got out in the press, but all the city of Salem, Oregon, got was advertising, that, without spending a dollar, was worth thousands of dollars to it. It is a joke with them that it was thought to be an advertising stunt; as a matter of fact it was just a boneheaded play. We heard of it in the New York papers, the Philadelphia papers, the Boston papers, the general tenor of which implied a compliment to the West on its initiative and originality in advertising, in devising a scheme that worked so well. It was just a schoolboy's bone headed play; but it seems to have secured results even if different than that intended.

The CHAIRMAN. Before passing to the next subject on the program, is it advisable to question whether there should not be something like a summary of this symposium, the bringing together of the representations and conditions that have been decided? I ask if it is in the mind of anyone to take up a few moments with that question. If not, having heard from Vermont, let us hear from Massachusetts, the Massachusetts plan for reforestation by Mr. Bazeley.

Mr. W. A. L. BAZLEY, Massachusetts. Mr. Chairman and gentlemen: The bone-head from Salem, Oregan, is not so very far away from me in appearing before you men and talking on forestry. In the first place, I know absolutely nothing about forestry except for my love of the outdoors and the way in which I have played with forestry on my farm in Worcester county. I first got interested in the ways of forestry by being one of the victims of the chestnut blight which struck Massachusetts, and when I had cut down one hundred and fifty acres of seventy-year-old chestnut it was not with a view of continuing the timber supply of the United States, it was with a view of self-gratification, it was my eye for beauty that impelled me to plant that area with white pine, and I rather think I am one of the few men, who have the position of state foresters, who before he knew anything about forestry planted one hundred and fifty acres of land to white pine. Now, when Major Stuart also asked me to say something here on Massachusetts state forests, we were in the position of the secretary from Salem. We have in Massachusetts what we call state forests.. It is an absolute misnomer; they should be called state plantations. Before the state undertook anything at all about fifty years ago a few men in the state down in one pine region, around in Plymouth county, started some plantations of pine which have been very successful, and my chief forester tells me that it has always been with a great deal of doubt that lumber men in the country have heard the stories of the growth that those plantations have made. The first official plantations in Massachusetts, as one might call them, were made by the Metropolitan water board, which board supplies the water for the city of Boston. They conceived the idea of planting the lands which were adjacent to their water supplies, and in the year 1900 began such planting. I believe now they have upwards of three thousand acres of land in very successful plantations. In 1904 the forestry department in Massachusetts was started. It was only started in a small way, and for many years it gave nothing but technical advice, did no forestry business of its own, as we had a very small and rather hazardous beginning. In 1908 the legislature passed our so-called reforestation act. The reforestation act in Massachusetts allows any citizen of Massachusetts to turn over to the state, either by selling or by gift, tracts of land not exceeding eighty acres, which the state can take and replant, and then any time within ten years the former owner of that land has the privilege of repurchasing the same, paying the state the money that has been spent on it for planting, care, and so forth, and in case it was sold to the state in the first place four per cent of the original price. Now, that has been a wonderful educational method of bringing reforestation before the people of Massachusetts. At the present time there are about one hundred and seventy of those lots, reforestation lots, embracing about seven thousand acres, and they are scattered in the various parts of our small state. You must remember that we have only five million acres in the state of Massachusetts. The seven thousand acres are, therefore, scattered along the state in one-hundred-and-seventy-acre lots, and the people in the vicinity of those lots take a great deal of interest in watching them grow. Of course, they are only beginning to show what they can do, and the people are getting interested in them. In 1914 a special commission was created by the legislature, known as the state forest commission, whose duty it was to buy up wild and waste lands, of which we have about one million acres, at a purchase-price of not more than five dollars an acre, forming them into state forests and planting them, and using them not only for forest purposes, but also for park purposes, to enlist the good-will of the people and the encouragement of forestry, and also to try and get the people out in the open air. That commission proceeded very slowly, and in six years they only succeeded in getting altogether fifteen thousand acres of land, divided into five so-called state reservations. In 1919 the department of conservation was formed in the revamping of our whole state government, whereby we reduced the commissions from one hundred and seventeen down to twenty departments, and in the department of conservation was placed the division of forestry, the division of fisheries and game, the division of animal industry, and the authority of the state forest commission was turned over to the state forester. When I was asked by Governor Coolidge to take charge of that department, I might say that I had everything from trees to mad dogs, and wondered why on earth they had done such a thing. Now that I am speaking, and referring to what Mr. Peters has said, in regard to the formation of the department of forestry, it seemed perfectly absurd to me to take hold of a department with the division of animal industry in it. Of course, it is a conservation measure, but it does not belong with forestry, it does not belong with fish and game; it was just a neat play of the man at the head of that division who did not want to get into the agricultural department, and by scouting around beforehand with friends in the legislature and getting an agreement that he should not be abolished, his was the only one of one hundred and seventeen commissions in the state that was not abolished. He was taken up bodily and put into the department of conservation as his department was constituted then. If any of your states contemplate revamping your departments, get busy and pick the units you want to get in with, then make friends with the legislature. Now, they made another mistake in revamping us, and that was that under the law the conservation commissioner had to be the director of one of the divisions, and Governor Coolidge designated me as state forester. It did not take me long to realize that the scheme of the legislature of saving one salary would never work out, and after serving in both capacities for one year and giving my entire attention to the division to which I was assigned, and very little attention to the other two divisions for which I am responsible. I have succeeded in getting the supervisor of administration to recommend that the conservation commissioner shall not be a director of one of the divisions, but should be head of the department, and that there should be a divisional director for each three divisions. I am perfectly sure from your talk that that would be according to your views. Last year we had a very interesting chance to size up the Massachusetts scheme of awakening interest in reforestation. The Massachusetts Forestry Association got the bee in its bonnet that the time had come to try and get a great deal larger scheme of reforestration started in Massachusetts. It was the first year that under the revamping of our constitution we were to act under the initiative and referendum, and they decided that they would try it out. The secretary went over the state, passed circular petitions in various towns, and we found that the returns from the towns that had these small reforestation plots in them had no difficulty in getting signatures for the greater work for the state to do. Everybody signed the paper as soon as it was brought to them. The consequence was that when they brought that petition to the legislature for legislation on reforestation they had thirty-six thousand signatures and it did not cost them a cent to collect them. When the bill came before the legislature it called for the taking of two hundred and fifty thousand acres of the wild and waste lands at a price not to exceed five dollars an acre, the expenses to be borne by a bond issue. That was too new an idea for Massachusetts altogether. In the first place, the legislature did not want to pass the amount of money necessary for two hundred and fifty thousand acres, in the second place they would not look at a bond issue, but in the final analysis they were absolutely scared to death at not passing something as long as it was the first petition brought up from the people on the initiatve and referendum. We spent several months trying to figure up some scheme that we could get the legislature to agree to and which would be suitable to the proponents of the legislation. The last week of the legislature they passed a bill directing me to buy one hundred thousand acres of wild and waste land at an average price of five dollars an acre, and to reforest the same, allowing me three million dollars which I could draw on at any time, the only direction being that I must buy the land in fifteen years. We have purchased under that act about fifteen thousand acres since the first of October. Now, this is a case where it may apply to your question about Indiana. I do not believe that in the state of Massachusetts it is a business-like proposition to have less than six or seven thousand acres of contiguous land to administer, but I do believe that the educational value of having a smaller plot of land is of so much more importance at the present time that wherever I can get five hundred acres in one plot I am taking it, and hoping to get in the very immediate vicinity of that five-hundred-acre plot more land, building up my seven or eight-thousand-acre or ten-thousand-acre plantation from that as a nucleus. I believe the educational value to the people, to get them interested to do this reforestation work on their private lands, is worth the extra amount in administration fees. One other thing on the purchase of these lands. Of course, it was contemplated that all the purchases be made from the wild and waste lands which are not producing anything today, but I am going on the theory also that it should be our care not to allow any more wild and waste lands to be manufactured. So I am going to the lumbermen and asking them where they are cutting off timber whether they will sell me that land when they get through with it, at the same time agree to certain reservations in their cuttings. I have all of ten thousand acres of land, where the lumbermen are simply cutting out the soft wood, which are about twenty-five per cent of the holding, and they are not touching any of the hardwood below ten-inch stumpage at the ground and a six-inch stumpage on the soft wood. I am also getting those men to leave all crooked and seed trees that are practically worthless for lumber no matter how large they are, and they are leaving them on our land; my idea being that instead of having such large tracts to reforest we can get in there early after the lumbermen and reforest just the land that has been cleared by them, in the midst of the hardwoods. The state is getting a very valuable asset which it can afford to hold for a number of years where the lumbermen will not. Whether I shall get caught up on that by some legislative bill I do not know, but I am taking a chance while the going is good.

We have also in Massachusetts seven reservations which have been bought by the state which cover about fifteen thousand acres, and which might be called beauty spots or scenic sights, which cover the mountain tops, and these have been bought by the state in conjunction with the counties, the state paying the purchase price, putting them in the care of special commissioners, the counties paying all the expenses of the administration. Very little work has been done on them except on Mount Wachusett, where they have had a very interesting experiment with prison labor. One particular law in relation to the forest is that wherever possible we shall use prison labor, who are trusted. Lying right outside of the city of Worcester we have drawn very heavily on the county jail there and have been very successful, indeed, in replanting Mount Wachusett with that prison labor. We found they did better work than all the day-labor we could hire. The men took an interest in it and were glad to work there, I was interested in another way. I was on the prison commission at the time that they went in, and they did not have to have any guards on these men. They went out in gangs of thirty-five to forty men, and it was understood in those gangs that if any man escaped from the gang that was working that day the rest of the gang did not go out again. The significant thing that we saw there was one man tried to escape and he was nearly killed by the rest of them, but that was the only escape that was tried in that whole reforestation business. It was a very successful thing. Since the Volstead Act came in we can not call on prison labor so much because we do not have the petty offenders and we can not get any prison labor at all.

We have in Massachusetts three state nurseries at the present time, and the output for the last five years has been one million and a half transplants per year. Last year we put out two million and a half, and we are immediately enlarging now to an output of five million and looking at a ten-million basis just as quick as we can get the nurseries in condition, not only for our planting, but because one man put a nigger in the wood-pile that was gotten through in that forestry bill. There was a joker in that bill that I was compelled to furnish plants to cities and towns free for use in their town forests. We have been making a rather fair income in selling transplants at cost for the last two years and where one city has been taking ten to fifteen thousand trees a year at seven to ten dollars a thousand, we are now receiving requests for next year of one hundred thousand free trees with the expectation of jumping to two hundred and fifty thousand just as quick as I can grow them. It is not altogether a bad joker, it just shows that there is a great interest in Massachusetts in bringing the land back to forest condition.

At the present time our cutting is between three and four million feet a year and we are importing two-thirds of the lumber we use. At the hearing on this big forestry bill last year two of the largest lumberman in the state made the statement that their freight charges for lumber that they brought into Massachusetts to sell was more than the cost of the lumber. I am glad to say that one of those lumbermen was in the legislature and helped me very much in getting the bill through, and the other one has just come into the legislature and is going to be a chairman I hope of a new committee of conservation which is to be a subdivision of our legislature from now on. So I am looking for a good deal of support in anything we want.

Now, as I have said before, I do not know anything about forestry. When I was put there I told the governor that I went there with the feeling that I did not know anything about forestry, that what I was going to do was to look at it from the outside standpoint and the business man's administration instead of the department. When I took the department I found good men there, splendid men, in the personnel of the department. I found lots of red tape and I found very little responsibility given to the men in charge of the various work. I have always believed in business, (and I do not see why it should not be true in state business) in picking a man out for a job, giving him a single thing to do, and then if he does not do it hold him accountable for it. Don't have two or three men tied up in reforestation work each one not knowing just where his line is, but tell him just exactly where his line comes; then nobody is going to bother him as long as he does his job, and if he does not do his job he is going to get out. I believe we have got more work done this year than has ever been done before, and at less expense, and I think with a great deal less friction between the inside and the outside on that account; the men knew when they said a thing that they were going to be backed up, and they knew that they had authority as to all matters of state policy to take care of everything in their particular end of the job. As I said, this reforestation game with us I do not consider a forest job at present, because save for a few years of planting we have not any such thing as state forest; I therefore put all our so-called state forests into the hands of our state fire warden, because I do not see any sense in reforestation unless your fire control is good, and until he tells me that a certain tract is prepared for planting I am not going to plant it. I am not going to put in half a million trees without any fire protection other than a general fire protection in the future. Where we are getting these plots which I consider call for future growth of forest, they must be protected, especially for experimental purposes, and where those places occur I am going to have fire lines around those reservations and through those reservations and have them properly patroled before they are planted.

Just one other thing and then I will let up. It might be a help to some others. We have had a great many complaints in the last few years from the devastation that is caused by automobilists. It has increased tremendously since automobiles have come into use generally, the stealing of Christmas greens and the cutting down of trees. Now, it has come forcibly to us because our plantations are getting just to the age when they look like bully Christmas trees, and the automobilist is coming along and filling his car up from anybody's land. He does not care whose it is. They are only wild trees and they take them with them, thereby ruining the plantations, or at any rate carrying off property from another man, where the value is very little in itself, but where it has taken ten or twelve years to bring the tree there and where the man wants it to grow for forty or fifty years more. I have just succeeded in getting an arrangement with our registrar of automobiles, and we have published it in every paper in Massachusetts, that any man convicted for stealing trees or shrubbery from any man's property upon conviction will have his license taken back. Now, a man does not care about five dollars' fine if he has got one hundred dollars worth of trees on his automobile, but he does not want to lose his license on his automobile. We have worked that in conjunction with our hunting licenses where we found that there was a great deal of complaint from the farmers all around my county. Before I went into office, their fruit, their vegetables and berries were stolen by the hunters; so this year we got the highway department to agree that anybody convicted of stealing from a farmer who had a hunter's license would have that hunter's license revoked. After two convictions this year we had no further complaints from farmers in our department.

Mr. PINCHOT. May I ask a question? I was very deeply interested in Mr. Bazeley's talk on the Volstead law. We are in the same fix in this state. We have arranged with the state institutions to do our tree raising for us, and we have embarked on the program of raising twenty million trees a year at the penitentiaries and insane asylums, and so on. I have laid before the directors of these institutions the statement, as strongly as I knew how, that here was the kind of labor that would fit the men they have. I was particularly interested in what you said in regard to prison labor, and was going to ask if there is any printed account. If you would give me a couple of typewritten pages, I will appreciate it, and will see to it that it gets to the very men in Pennsylvania with whom I am taking that work up.

The CHAIRMAN. Are there any further comments?

If not, the next paper will be on Stock Surveys in the State, by Mr. F. W. Besley, of Maryland.

Mr. F. W. BESLEY. State Forester, Maryland. I am going to tell you very briefly and very simply of the system of forest surveys that was undertaken in Maryland at the time that the forestry work was inaugurated, in 1906. We felt that it was exceedingly important for us at the outset to learn at first-hand just what we had in the way of forest resources, very much as the business man makes an inventory of his stock in order that he may more successfully and more intelligently conduct his business. Fortunately, in Maryland at that time there existed very good base maps. The state geological survey for a number of years in cooperation with the United States geological survey had been preparing topographic maps of the different counties in the state. At the time we began our forest surveys probably three-fourths of the state had been covered in that way. In addition to topographic maps there were geological maps, and soil maps of many of the counties, so that we had a very good framework to begin with. Since these surveys of the minerals and of the soils had been found valuable, it offered a very good suggestion of carrying out the same thing in regard to our forest areas. Maryland has a variety of conditions. We have the coastal plane, the rolling country, the uplands, and the mountains, practically all of the conditions to be found in any other state. So the kind of work that was done there may be carried out equally well in other states no matter what may be the surface conditions. We have found that those surveys are exceedingly important in the first place as giving us a reliable inventory of all our forest resources, and as a basis for an intelligent state forest policy. The forest maps are of great help in preparing fire plans. Knowing where the bulk of the forest lands are situated it is possible to see at a glance where are the greatest fire hazards and better locate fire wardens. We have found them of inestimable value in many ways and use them constantly.

The first requisite in establishing the forest-surveys is a good base-map. Any state that does not have a good topographic map to begin with is very seriously handicapped. I think however that most of the states in the East have their areas very well covered by these maps of the geological surveys, which are very reliable, and that situation is largely met. The second requisite is a good working field force that can make maps and estimate timber. In Maryland the county is the unit so we worked up each county separately. We used men with considerable training in the matter of mapping and some knowledge of timber estimating, sending one in a county, with a base map upon which was projected in outline the various forest areas. In this connection we found that the geological survey in making maps, in the last fifteen years at any rate, had generally outlined the wooded areas. These are in the form of woodland sheets. These sheets have not, many of them, been published, but they are on file in Washington, and we copied them on our topographic base maps where such data was available. We found they were very accurate and helped us enormously in making out forest maps. One of the important considerations in making forest maps is that the work shall be standardized. If it were physically possible for one man to make all the maps so that his ideas of timber stands could be carried out in a very uniform way all over the state, it would give the most uniform results but, of course, this is impossible. When we started out we took about three or four counties at a time. One man was assigned to a county, and then a forester was assigned to supervise, in order to keep all the work up to a certain standard. The mapping included the outlining of the forest areas, and we noted areas of five acres or more in extent; but the data also required the delimiting of forest types. The forest types used were commercial types and not forest types as generally understood. In most of Maryland we have hardwood forests, and we divided the hardwood into three general classes, beginning with the very young stands up to about twenty feet in height, which we put into the sapling class. Then we took the culled forests, which has been cut over, and which generally did not contain a sufficient amount of timber to justify logging operations. We called this the culled class, and in that we had about three different sub-divisions. Then we took the merchantable class, which contained a sufficient stand of timber on the average to justify logging operations, and this was divided into three or more different classes, the class being determined by the average stand of timber per acre. Likewise in the pine forests we divided them into a number of different classes, so that when our map was completed we had not only the exact location of the different wooded areas, but we also had them classified as to the stand of timber. In order to standardise the classification by these individual men the forester worked with them at different times, taking an occasional sample plot in order to check up their estimate. This was done all through the period that they were making the surveys, so that we felt that the results obtained were uniform. In addition to securing the detail surveys or outlines and classifications of forest lands we also gather an immense amount of other information. For example, we found out the uses of the forest in the different sections. We found out very much about the fire damage in the different sections. We found out the number saw mills that were operated and the approximate cut of timber in the county, and in fact all the detailed information of that sort was secured at the time the surveys were made.

The method that was used in taking these surveys depended somewhat on the character of the country. In the very rough sections where roads were very poor, the forester traveled on horseback and worked out from a control point for several days at a time. He would cover approximately fifteen square miles per day; this varied somewhat, but that was about the average. Where the roads were suitable for vehicular travel, which was the case in probably nine-tenths of the state, he used a horse and buggy. He drove over all the roads and a great many of the private roads, got into the timber a great deal, and in this way he could cover about twenty square miles per day. Then in some sections where the roads were exceptionally good and conditions were very favorable, the automobile was used. Most of our survey work was done some years before the automobile was used as generally as it is now, so that we did not cover very much of the state in that way, but we found that in this way approximately fifty square miles per day could be covered.

In regard to the cost of the work, this I believe would run between forty and sixty cents per square mile for the field work, even under present conditions. At the time we made our surveys the average cost was about thirty-five cents per square mile for the field work. We found that working up the field data and publishing the maps on this large scale was rather expensive, consequently we have published large scale maps of only about one-third of the counties of the state. We have twenty-three counties. Here is a forest map of the agricultural section (exhibiting a map). This county has next to the smallest percentage of woodland of any county in the state. We use two colors on our maps. The red is hardwood, and the green is pine, practically all are hardwood in this particular case (indicating). This represents the forest in one of the heavily forested districts of the state (showing another map). This has 62 per cent of forest land. These maps were made up in this form of approximately a mile to the inch and put inside of one of these forest reports, which gives much information regarding the forests of the county. We found that probably one of the most expensive features of the thing was to publish these maps. These are all lithographed. This map here I think cost us in thousand lots, thirty-five cents each, so that we could not distribute them very generally. Consequently we adopted another plan; the large field maps of the different counties were reduced in scale to three miles to the inch and published in the Report of the Forests of Maryland, giving a small scale forest map, and much detailed information about each county of the state. We use these maps constantly, and have found that even if we did not publish them that it would be well worth while for the amount of detailed information that is acquired in these surveys. We sometimes have men come in who want their wood land examined, and with one of these maps they can very frequently locate their particular wood land.

The question might be raised as to the value of these maps in view of the fact that a great deal of cutting is going on and the commercial types will change. Maryland is a state that has been almost completely cut over. We have a very small percentage of original growth, so that the changes that are taking place are not very radical changes. We find that these maps are quite reliable even where cutting is going on, because it does not change the types very materially.

Maryland, I believe, is the only state that has a complete forest survey. Other states have done some work along this line, and found it practicable. Where good topographic base maps are obtained there is no doubt of its practicability, and I believe is the very best way of showing graphically forest conditions. (Applause.)

The CHAIRMAN. Are there any more remarks on Mr. Besley's description of the work in his state?

If not, the next subject will be "The Acquisition of Lands by the State," by Mr. G. W. Woodruff, of the Pennsylvania Department.

Mr. G. W. WOODRUFF, of the Forestry Department of Pennsylvania. Mr. Chairman and gentlemen: Mr. Pinchot has told you about the value of publicity, and so forth, and his publicity man is becoming so very active under his good tutelage that he hustles me to write out my part on this subject, and while I sat here listening I could have made a very much better talk than I did if I had waited to write it out until afterwards.

I think this question of the acquisition of state forest land divides itself up into such questions as: Why should the state acquire state forest lands? What shall it acquire? How shall it acquire it? And then subordinate questions like title examinations, reservations to be allowed in the deeds, the question of taxes, payments by the state in lieu of taxes, and what use this land will be put to after it is obtained. Now, that is about the way I would have approached this subject if I had the opportunity after listening to the address of the eminent gentleman from Maryland. Nevertheless, I am going to read some of what I did write.

At our present stage of civilization this country tacitly assumes, as a general proposition, that the state should not enter into any business other than the administration of government affairs. However, this rule has broken down, and will continue to break down whenever the public welfare is in material danger. During the last war those who were in business, as I happened to be then, were amazed by the way that the government stepped in and interfered with private business. The company that I was with had some sea-going boats that were commandeered. One of these boats was earning seventy thousand dollars a month. The government took it and said, "Continue to use it in just the same business, and we will let you have twenty-three thousand dollars a month; the rest of it will go into the hands of the Shipping Board." We have heard something lately of the rule that the state will not interfere with matters that are in the hands of private business, but it breaks down, as I say, when the public welfare is in grave or material danger.

The protection, production and reproduction of forest products, up to the point where they are to be manufactured and disposed of outside of the forests themselves, has been unconsciously recognized as one of the matters vitally affecting the public welfare, present and future, and also apparently not safe in the hands of private land owners.

Consequently, as far as I can see, without any open recognition of a revolution in the ideas of proper government activity, the nation has set aside one hundred and fifty-five million acres of land for forest purposes, and Pennsylvania (as an example of state activity in this direction) has already purchased from private owners one million one hundred thousand acres of land for state forest purposes.

Practically all business interests are directly affected by the lessening of timber supply, and all governmental agencies recognize that the nation and the states shall own, protect, reforest and afforest enough of the land not valuable for other purposes than growing forests, so as to meet the principal part of the forest-product needs of the country.

So much for why, as far as I can see, we should acquire forest land, not because the state wants to go into the business, not because the Federal Government wants to go into the business, but because there is a vital economic need to protect the public welfare which has forced itself upon the attention of the state and nation and forced them to break every general rule without hesitation.

In purchasing land for state forest purpose the Pennsylvania Department of Forestry has assumed the following attitude: First, that for the present they can leave the farmers' woodlots to the good sense of the farmers; second, that for the present any forest land actually valuable now, or in the immediate future, for lumbering purposes should, for the present, be left in the hands of the private owners on the ground that they will not allow valuable property to be destroyed by fire, if they can help it; third, that even the most barren land capable of reproducing any kind of wood-growth, and particularly the land which will require a long period of protection to make it productive, should be acquired by the state as rapidly as funds are available.

Following out these principles, the state is likely to buy cut-over and desolated forest land at two dollars per acre when it is not worth more than that in the open market rather than to buy good forest land worth fifty dollars per acre for, say, twenty dollars per acre. This is not the business viewpoint, but it is the attitude of the state, which is not thinking so much of making an immediate or money profit as of protecting the welfare of its citizens, particularly of posterity.

During the last summer and fall the bureau of lands has with considerable effort secured formal offers of three hundred thousand acres of land, with a promise that, provided our appropriation of this winter requires it, as much more will be offered at low prices. Besides this there are six thousand acres being offered every day, and beside that three hundred thousand acres are apparently in sight if we need them, which means that there will be upwards of a million acres ready before the legislature can pass this appropriation bill, and the object of getting the offers is in order to get competition, if there is a large appropriation, especially to maintain competition amongst those who are willing to sell their land. With an appropriation of two million dollars, and only land enough to take up two-thirds of that, I can readily understand that those who offer their land would try to get a higher price than they would if they knew we had offers worth three million dollars and only two million dollars to pay for it, especially if they understood that the present though of the Department of Forestry is that, other conditions being the same, the land offered at the lowest price per acre will be given first consideration. The "other conditions" would be particularly the advantage of the land in rounding out or completing our present state forests, and possibly the presence of a house or other buildings valuable for use in administration purposes, which would be a small factor even in acquiring as little as three or four hundred thousand acres of land.

If enough appropriations can be secured this winter there will probably be one or more new state forests started, particularly in Sullivan county, where a compact body of more than one hundred thousand acres valuable for state-forest purposes can be secured at low prices.

If you will glance at the map of the state of Pennsylvania (indicating) you will see that the state forests make a considerable showing. Pennsylvania is one of the small states comparatively speaking, nevertheless it is much larger than others. It could be said without casting any reflections upon any one that this area of six million acres which is contemplated to be purchased, is larger than the entire state of New Jersey.

Mr. GASKILL. In quantity not quality.

Mr. WOODRUFF. In quantity it is larger. You will see the green here (indicating on map) are the present state forests. It is nearly one million one hundred thousand acres, which makes quite a showing on the map. When it becomes six times as great, as it properly should and is believed to be necessary by the present State Forest Commission, you can well imagine that that map would look a little like Ireland, especially if these red spots become more conspicuous as the game commission sets aside further game refuges.

The average paid thus far for state forest land is two dollars and twenty-eight cents per acre—I was going to show you, here is a place right in here (indicating) where Sullivan, the southern border of Bradford, northwestern Luzerne, and southwestern Wyoming, come together; there is a piece of land, I think considerably over one hundred thousand acres, which may be gotten. There are probably here six or seven thousand acres that will ultimately become state forest land.

There is another place where forest service allows it to be made public, and I am not giving anything away, namely, in the four counties right here (indicating) of Warren, McKean, Elk and Forest county, and where are certainly eight hundred thousand acres there on the head-waters of the Allegheny that abut on one hundred and fifty thousand acres right over the line in New York, and it is within the range of possibility that under the Week's law it might be extended in time further south. There (indicating) is another place where the state could easily put a forest, several hundred thousand acres, and not take any land that anybody will claim is valuable for agriculture at the present stage of the development of agriculture and the need of the country. The average paid thus far for state forest land and is two dollars and twenty-eight cents per acre. The law restricts the Department of Forestry to a maximum of ten dollars per acre, but the Department does not pay as high even as five dollars per acre except with extreme reluctance.

Dr. ROTHROCK. For the surface right alone. That ten dollars an acre contemplates even taking only the surface.

Mr. WOODRUFF. Yes, the surface.

On July seventh, 1919, a specific condemnation law was passed, which provided that if the Commissioner of Forestry believes that land should be acquired for state forest purposes, and can not agree upon a price with the owner, or can not find the owner, he may enter upon and take possession of the land, and thereafter, by means of viewers appointed by the court, the price to be paid will be fixed.

This law has not been tested, but it has already been decided to use it in two ways: first, in order to get rid of obnoxious interior holdings; and second, in order to obtain good titles in particular instances where the land is desirable, and the alleged owners are willing to have an agreed verdict at a low price, if the court should decide that it has power in the condemnation proceedings to determine the right of these alleged owners to receive the purchase price.

Land has been purchased in Pennsylvania for state-forest purposes with allowance of all kinds of reservations, such as oil, gas, coal and other minerals, rights of way of all kinds timber cutting rights, and so forth; but the Department of Forestry has established the principle that except for rights of way, which may be reserved during their use, all reservations must have a definite termination in time; also that mineral reservations will not be allowed unless there is reason to believe the mineral is existent in the land, and that discovery must be made within a definite time, and production of mineral known or discovered completed in a definite time; also that timber cutting rights will never be allowed except when the land is highly desired for state-forest purposes, and the Department is sure that the timber-cutting allowed would be exercised upon the land anyway if it were not purchased. The theory is that since the private owner can, under the present state of the law, cut as closely as he desires if he retains title, the state will be in no worse position, and, perhaps, in a better one, if it buys his land subject to timber-cutting rights with all reservations at an end as soon as any determinable unit of land is cut over once.

That is slightly different from Mr. Besley's idea, as I understand it, that he would take land when the cutting is complete, that his idea is to actually buy the land and take the title and record the deed, and the former owner is left in charge of the land with the right to cut, and then turn it over to the state, but only the right to cut according to the reservations. Of course, the state owner of the land can be there to see what he is doing all the time.

In Pennsylvania every kind of utilization of the land and resources of the state forest is allowed either by specific law or by general power granted in the act of February 25th, 1901, permitting the State Forest Commission to establish such rules for the control, management, protection and development of the state forests as in their judgment will conserve the interests of the commonwealth. Such utilization includes camping permits; recreational sites; rights of way of all kinds; business use, such as hotels, boat-houses, etc., timber sales, mineral leases of all kinds, water uses, and, in fact, every possible utilization of the lands and resources of the state forests which is not harmful to the purposes for which they were established.

Payment for the state forests has been made thus far by appropriations, the first purchase being seven thousand eight hundred and eighty-four acres in 1898; the largest purchase in one year was one hundred and seventy-one thousand three hundred sixty-four acres in 1902; the smallest purchase five thousand and fourteen acres in 1916 The average number of acres purchased per year over a period that we may call twenty years has been fifty-five thousand acres annually.

The examination of titles has been carried on in this state in a way that sometimes caused the Forest Commission, I can say, to stop and think, and it is stopping and thinking now about it. I sometimes shudder at the responsibility for whoever is the head of the acquisition bureau, if he had to determine these titles himself, and I would shudder more for the Attorney General's office or the Department of Internal Affairs if they had to examine them. On the other hand, I suppose that we should not be afraid to depend upon administrative officials to do their duty and to attend to it and do it just as well as an out side agency.

One outside company known as the Potter Title and Trust Company of Pittsburgh has examined and passed upon the titles to the Pennsylvania state forest land, without insuring them. It has simply given a certificate for each case directly after it has examined the title and has cleared up everything that it deems necessary to have cleared. It certifies that the title is good in the opinion of that company; and there has been so little loss of land, and so little trouble with regard to the title, that it has practically exemplified the practice used. The system of bookkeeping up to this year has not been possible for us at a prohibitive cost of time and expense, to determine exactly the question that the state forest commission asked me right away, how much is it costing; but we do know now how much it is costing, and we can draw conclusions from that.

The only other thing that I will speak of is the taxes. This state has assumed the attitude that if it takes away from taxation as much land as you see here in green (indicating), and ultimately nearly six times as much, it is not fair to the county and the township, to the roads and schools, to the poor and those who have charge of the roads and the schools and the poor, to take away from them the opportunity of taxing the land and not do something in lieu thereof. Hence they have adopted the law that for every acre of land set aside as state forest land, the state shall pay two cents per acre for roads, two cents for schools, and a cent for general county purposes. At this time what they get is certainly equal to what they would get for taxes; but much of the forest lands of this state, and perhaps of other states, is taxed, and perhaps properly so below its actual value, whereas under the law of the state it is supposed to be taxed at its actual value.

Just one last word, in passing, and because it was brought out by somebody here, and perhaps would be a matter of importance, and that is the question of what this state does in regard to exempting forest land from taxation to try to encourage the growing of forest crops. First of all, the practical thing we do, and then the important task of drawing a conclusion from the practice here and probably in some other states. Practically we have passed what is known as the auxiliary forest reserve law, whereby anybody who has forest land may get his land identified by the department of forestry as an auxiliary forest reserve. There are certain rules in regard to the care and management of that land which are promulgated by the department of forestry. There is supposed to be an inspection of this land from time to time to see that the owners live up to these rules. Under this law they can not be taxed more than the bare land value and not more than one dollar per acre. When they are ready to harvest their crop they must announce that fact and they must pay ten per cent of the stumpage value determined ahead of time, and may be required to give bond for the payment of this ten per cent. That law was passed in 1913. I think there were only eight thousand acres out of the twenty-four million acres of this state that have been put in the auxiliary forest reserve. Even this small area has never been inspected, but one of these days it will be inspected to see what is happening to the eight thousand acres or so. I hate to take issue with friends like Mr. Wirt, eagle-eyed and eagle-brained, but after all the facts are substantially so. I may be a little bit wrong in some of these things. I did not prepare for this particular point, and even though it is eighteen thousand instead of eight thousand acres it makes no difference. The principle of invoking the "coax method" of getting people to produce timber seems to break down. I do not know whether that is so, but for some time I have been confident it is.

This state also had a law for planting trees along highways which was taken some small advantage of, but I doubt very much whether it was a success. What I am advancing, however, is rather an expression of opinion. That the "coax method" of getting private individuals to grow their trees does not work. There may be some other way of coaxing that will work. I believe that we have got to have a "prod method". But you are never going to use the prod method on the man who is handling his own private land until it becomes vitally necessary to the public need, but that is the very thing which is coming, as Colonel Greely and Mr. Pinchot told you today. The nation or the state, or both, certainly are not going to let this land become desolated, devastated and unproductive when we know that time is coming. If it does, we will be in the same position as China and other states that have done the same thing.

Dr. ROTHHOCK. In regard to the tax law, I do not think it was ever very cordially received.

Mr. WOODRUFF. The auxiliary forest reserve law?

Dr. ROTHROCK. The auxiliary, yes, by the forestry administration. My colleague and I on this commission were very much interested, although for several years we had been exercising our wits to see if we could not bring about such a condition of affairs as was contemplated there; but it was very coldly received, I think, by the past forestry administration. There never was very much public interest shown in regard to it. It should have been pushed a little into the public notice.

The CHAIRMAN. What might have been the bearing upon that thing?

Mr. WOODRUFF. I do not think at that time it was contemplated at all by the parties that were interested. It just seemed to be a case of indifference. I think that because the question never was raised in the minds of these prospective applicants for those lands as to what the fire-menace was. It just seemed to fall flat.

The CHAIRMAN. It did not appeal.

Mr. WOODRUFF. It did not appeal. However, I may add something along that line by saying that ninety-five per cent of the timber owners do not know that there is such a law. There were some applications made that I know of that I never succeeded in having action taken upon, and that leads me to think that probably the partial explanation of the failure was the indifference of the past administration to look after that particular aspect of forestry.

Mr. HARRINGTON. I would just like to ask a qustion with regard to the payment of the taxes on the lands that were taken over by the state. I was wondering whether that question was ever considered by the supreme court of this state, and as to whether or not these payments were made from direct appropriations, or whether they are paid out of the receipts that the department takes in, or just what the method was.

Mr. WOODRUFF. It would be interesting in the line of what we are talking about. They are paid out of a direct appropriation. There is an appropriation for that purpose. The receipts of the state forestry department in Pennsylvania from any source whatever, are paid into the school fund of the state, and none of the net receipts of the state forests are retained. But it would also be interesting probably to the outside state foresters, Mr. Pinchot. Because the proceeds have to be paid into the school fund, the department of forestry has no good out of its earnings of any kind. Dr. Rothrock, considered away back, that it was net proceeds that were meant by the law and not gross proceeds, and this summer we put up to the Attorney General the question of whether the law meant net proceeds and whether, when in order to make net proceeds from some particular kind of activity, operation or utilization, we might actually use the money we receive, to put in our own portable saw-mills, cut blighted chestnut trees, in short whether or not we might pay all these expenses out of the gross receipts, and then identify and turn over the remaining net proceeds to the school fund. The Attorney General found that there had been a decision practically to the same effect a great many years ago, and confirmed it to our great advantage not only in handling the questions like the blighted chestnut but also to the school fund itself, because we could not have induced an outsider to come in and pay stumpage to take out these scattered chestnut trees.

Dr. ROTHROOK. I happened to be right on the inside of that chapter of the school code. It was drawn up by Dr. George M. Philips, who was a townsman of mine, and in drawing up that particular portion of the school code he wanted to know how the forestry department would look upon it. The original draft was that the proceeds, simply the proceeds, meaning the gross proceeds of the sale of timber and all that, should go to the public school system. I insisted that that was unfair and that it should be made net proceeds, and that was the statement I believe in the law. It was not a question of whether the net proceeds or the gross proceeds was the rule, but it was in the construction of that rule that the net proceeds were distinctly specified in the agreement that I had with Dr. Philips. And here was another thing. We wanted growing timber exempted from taxation. This tax law grew out of the clause in our state constitution, I believe, which says that all taxes upon property of a given class shall be evenly laid, that in other words there shall be no exemption from taxation in a taxed class. We tried to have this phrase alone, as the gentleman from Alabama has suggested, omitted. We wanted some system by which taxation could simply be evaded, but there was that constitutional clause which confronted every governor from the time of Governor Beaver down, until the time that this law was finally passed. We had wrestled with them in the courts, so that we could by some means exempt the state lands, or the lands that we wanted for forestry purposes from taxation, but it was not possible and finally we resorted to this auxiliary system, which originated with Mr. Elliott.

Mr. BAZELEY. The way in which we take timbered lands which are to be cut, we take the title of the land and pay over the money with the reservations in the deed, because in that way we feel we can hold the lumbermen to the reservations much better, because if they don't observe the reservations we take back the land, and they lose.

Mr. HARRINGTON. I still want to know if this matter has ever been put up to the supreme court of the state. It has been in our state.

Mr. WOODRUFF. This law was taken as a matter of course, and nobody ever raised any objection to it in the way of a quo warranto proceeding.

Mr. HARRINGTON. It may be interesting to know what happened in our state. We were up against the same situation. About five years ago something in the neighborhood of two hundred thousand acres was purchased in the northern part of the state, bringing the state's holdings to three hundred thousand acres in four counties. In some of the towns this state land, which was exempt from taxation, rose as high as seventy to eighty per cent of the acreage. Now, the government, the local government, could not stand the expense of road construction, schools, and so forth, and later on there was a vigorous and in most cases justified opposition to the development of the general forest plan that was being carried out. The whole opposition I think to the development in Wisconsin of a forestry plan came about through this tax question. The matter was brought to the attention of the supreme court. A bill was introduced in the legislature to pay in lieu of taxes five cents an acre, just like you have here and just like they have in Michigan, and the court held that it was unconstitutional, and that is the status of the situation at the present time. The result is that wherever you go or any meetings you attend, or in talking with citizens of northern Wisconsin where these state lands still exist, this tax question is always referred to and generally not in a pleasant manner. The taxpayers in that part of the state in my estimation have a just and good complaint. A good many of the towns have as high as seventy or eighty per cent of the land exempt from taxation. It is dangerous, and it seems to me that it is one of the most vital things in the whole policy of the general acquisition of the state forest lands to provide some way whereby these towns can be reimbursed for these state properties within their limits.

Dr. ROTHROCK. The state is obliged by the law to pay this five cents per acre.

Mr. HARRINGTON. We have a provision in our law whereby we can exempt up to forty acres for forest plantations, but nobody has ever taken advantage of it.

Mr. BAZELEY. It may be interesting to know the way it is in Massachusetts. All the state lands in Massachusetts are assessed by the state tax commissioner every five years, and the tax on that is paid directly to the towns in which the state land lies, directly to the treasurer of the municipality.

Dr. ROTHROCK. There is a very interesting fact that I think ought to be stated here. We have a list of the first land that was purchased in the state of Pennsylvania under what were known as the tax sales. At one time there were two million acres in the state of Pennsylvania upon which the taxes were not paid. A good deal of criticism was made. Upon that law the state proposed to go in and purchase the land, and then the cry was raised, and the people complained that that was taking away their lands from them, and that we were depriving them of their rights, and all that; but the result of the operation of that tax law was that you can hardly buy an acre of land now at a tax sale. Taxes are paid all over the state and promptly paid. We can not buy land at tax sales. I remember one particular tax sale with a thousand acres at four cents an acre, land the state would not sell today for ten dollars an acre.

There was another interesting thing that came up when the state bought these lands, and they allowed the counties their four cents an acre, subsequently an additional cent an acre, making it five cents an acre. The county treasurer finds himself in better condition than he had ever been before the state took possession of the land. I do not believe there is a county in the state today that would be willing to go back to the old system. I think where the state has taken a foothold in this land in any county the people are satisfied that it has been so. With private cooperation of their citizens we have given them better protection against forest fires and a lot of things in which their condition has been improved, and every county of the state I say where the state has advanced into it is satisfied with the ownership by the state.

Mr. WOODRUFF. May I add one thing? The purchase of the land is jutified from a business standpoint in this state, because a very conservative appraisal of those lands bought in Dr. Rothrock's administration, we will say, for which about ten or twelve years is he average life of the purchase, and that cost, as you can see, only about two million three hundred thousand dollars, and the administration has only run that up to about five million odd dollars, and a very conservative appraisal of those lands today is ten million dollars from a commercial standpoint, which is a comforting thought outside of the benefit to the public.

Mr. CHAPIN JONES. I just would like to inquire of Judge Woodruff how that five cents an acre tax compares with what the tax would be if the land were still in private hands.

Mr. WOODRUFF. The county treasuries are better off than under the old plan of an assessment which was always very low.

Mr. JONES. How is that five cents arrived at?

Mr. WOODRUFF. The Department of Forestry certifies to the treasurer for each county how much state forest land there is in that county, and makes a requisition on the treasurer of the state and a check is drawn by the state treasurer of the state to the county treasurer, I think.

Mr. JONES. How did you decide on that five-cent figure?

Dr. ROTHROCK. It just grew, that is all. First of all, there was three cents given, as I remember it. Then they came out specifically for two cents for schools, and later on they came out for two cents for roads, not on any particular basis at all, and then last session they came out for one cent additional, which was advocated by our friend, Mr. Pinchot, particularly, and they passed one cent for general purposes; so it is entirely arbitrary.

Mr. JONES. It is all a matter of law?

Mr. WOODRUFF. The determination of values by the regular method, and I think it would give us a more fair assessment generally.

Dr. ROTHROCK. Let me give you two concrete illustrations of the relative merits of allowing two cents for schools. In two of the counties of this state, as the state had been acquiring large bodies of land, the school fund in one case and the road fund in another case was so well looked after that they did not need the state's help, and the collectors appropriated the money for their own use and they were subsequently surcharged for it.

The CHAIRMAN. Gentlemen, it is six o'clock. Do you wish to continue this discussion, or shall we call it off until eight o'clock tonight? At eight o'clock there will be a baked-apple party. I would like to remind you also that at nine o'clock tomorrow morning, not ten o'clock, we will convene here in this room and continue this wonderfully interesting discussion of these problems.

At six o'clock P. M. the conference adjourned until Thursday, December 9th, at nine o'clock.

Senate Chamber,

Harrisburg, Pa., Thursday morning,

December 9, 1920.

GOVERNOR OLCOTT presiding.

The CHAIRMAN. The conference will please come to order. If since yesterday there have been any acquisitions to our ranks in the way of state foresters or representatives of state forestry departments, I wish they would make themselves known to the secretary and hand their names to him so that we may make a full and complete record.

Are there any suggestions from anyone as to the program other than to proceed along the scheduled line? If not, we will take up "State-wide Forest Protection in New Jersey," by Mr. Alfred Gaskill.

Mr. ALFRED GASKILL, State Forester, New Jersey. I take it for granted that state-wide forest protection is in the mind of every forest official. That is the ideal toward which we must work; if anything less than its actual accomplishment is considered it can be temporary only, and because circumstances or conditions require us to adjust our efforts to those conditions. I cannot see, in other words, how any state forester, or any official organization, can undertake to maintain a fire-protective organization which does not cover the whole exposure in the degree that is required. The next ideal, as I see it, is that a protective service shall approach as closely as may be the paid fire department that is established, and maintained as of necessity, in every large city. We know well enough that we can not have paid fire departments in our forested areas, it costs too much. Perhaps they are not necessary, certainly not in the degree of refinement that they are necessary where the property to be protected is worth so much, but surely we must get the first essentials of such an organization. That is adequate control in important sections, and some sort of service throughout the whole area.

Now, a good many states, Jersey amongst them, have tried to get along with a good bit less than what they have indicated as the ideal. We have tried ex officio wardens, we have tried volunteers, we have tried, in short, to get something for nothing by one means or another, and usually we have gotten nothing for something. It has not amounted to anything at all so far as efficiency goes.

I shall speak with a good deal of diffidence about what Jersey has done, for two reasons. First, because our accomplishment is so far short of our aims; and next, because what we have done, and what we have not done, may mean absolutely nothing to those of you who have different conditions to deal with. You can not set up a standard, for any state, or any section, that is going to be profitable to any other state, or any other section, unless you find identical conditions there. The program must be fitted to the exposure exactly as you find it, and by exposure I nothing by one means or another, and usually we have gotten nothing for something. It has not amounted to anything at all so far as efficiency goes.

Fifteen years ago Jersey enacted a law intended to bring about a better order of things in a state which perhaps represented more truly than any other the extreme of forest devastation. It is true enough that Jersey is small in area. It is likewise true that she is so situated that every one of her resources and interests is magnified in several ways, so that they become pretty important. Our forest exposure may be surprising to some of you, but it includes forty-six per cent of our area, and considerably more than half of it is pine forest; couple with that, if you please, the greatest concentrated population in the whole country on one side of us, and the third greatest on the other side of us, and our little state may be considered, I sometimes say, as a thoroughfare rather than a community. The whole country passes through Jersey in its communications from the west and south with the great center in New York, and to and from our seashore resorts. We have more miles of railroad to the square mile of territory than any state in the Union, one mile of railroad to three square miles. Even Pennsylvania is better off in this respect. We have twenty-five thousand miles of highway, and ninety per cent of these highways are used by automobiles. The state issues approximately one hundred thousand hunting licenses. The gunners literally pour from the cities to the country communities to enjoy a day's sport at somebody else's expense. Now, I do not quarrel with hunting on legitimate hunting ground, but I do contend that in organized communities and in densely populated sections, such as are found in that little state across the river, there is no room for that sort of thing. Something must give way in the interest of what we foresters believe is development and progress. Then there are incoming settlers cleaning up homes, and many wanderers in the woods—and most of them seem to be cigarette smokers. We thus have a very complex problem to deal with—the railroads, hunters. automobilists, pleasure-seekers, all sorts of people using the wooded areas, because they are easily accessible, and because, in spite of all you can say about it, the woods of New Jersey are pretty attractive. The south Jersey pine-lands are full of flowers in the spring, and full of color in the fall, and the mountains in the north have their attractions.

Now, that is about what we have to deal with—forest cut over not once but two, three or four times; forests so burned that portions of them will not come back in a natural way, although it is surprising that the effect of the fires is so slight. There really are mighty few areas where the natural forest is not simply pushing for a chance to come back. That is true of the pines as well as of the hardwoods. We started out with the idea, somewhat different from that of other states, that fire-prevenion and not fire-suppression was the goal. I do not mean that we must not control the fires that start. It is obvious that we must. But whatever organization is perfected, it should have in mind first of all the prevention of fires. We gave over at once the thought of using volunteers. You do not get anywhere with them, and we settled upon the principle that any man who was engaged in combating fire in any way deserves pay. We could not afford to pay a great deal, but exactly as the small town or borough finds that it can support a volunteer fire organization by providing a good equipment and a supper now and then, through which the interest of the men is kept alive, so it seemed to us advisable to assure pay to every man engaged in the forest fire-service.

The organization that in the course of the years has been created now numbers about three hundred and seventy-five wardens in one hundred and sixty-five townships. It is so arranged that few of these men have more than five thousand acres to look after. Three-fourths of them have telephones in their houses. These men are under the direction and control of a state firewarden who has four assistants called division firewardens. They keep in touch with all parts of the organization, investigate fires, check up reports, see to getting the right men appointed, and that they are on the work and keep it in hand. It is a rather inadequate, but still fairly efficient, state control. Under the law a township warden is given the magnificent sum of twenty dollars a year, as a retainer and as compensation for issuing permits, posting notices, making reports; but it serves to enlist him actively in the service. A district warden, where a township is too large for one man, gets ten dollars a year. When we first made this provision I expected that we should have to increase the rate after a while, that the men would not be satisfied for long. As a fact, they are satisfied and there has been no demand for more; the little sum of twenty dollars, or ten dollars, comes to most of these men as easy money. In addition to this allowance, the law provides that any warden who goes to a fire shall get at least two dollars, no matter how short a time he is there. Until last year he served up to five hours; the law now reads that a warden going to a fire shall have two dollars for any service lasting two hours or less, and any man that he calls out to help him shall have one dollar for any service of two hours or less. The idea is to get there quickly and put the fire out, to make slight fires. If the men are required to work longer than two hours the warden is paid at the rate of fifty cents per hour and helpers at the rate of forty cents per hour. This all means that the interest of every warden, three hundred and seventy-five men, located all over the state, is enlisted and maintained, and that they are quick because they get their pay if they do not have to do much. If a man is located where fires are plenty, and he is frequently called out, he will adjust his work to that condition during the forest-fire season, and be ready for fires, the pay compensates him for the time that is expended. The plan seems to work well, and, as I said, there has been no demand yet for an increase of the retainer. We call it a retainer, rather than a salary, because it is so insignificant.

The wardens are appointed for three years, and are township, not state officials. The idea is that the fire-service should enlist as large a part of the population scattered through these districts as can be done. We cannot have a big state force, but we can maintain a considerable local force supported by local interest and local pride. The township committees, at the direction of the department, make the appointments. The department can say if the townships shall have wardens, but the township committees actually appoint the men, and if the state firewarden does not like the appointees he can dismiss them. That virtually puts the power in the hands of the state authorities while satisfying the pride and interest of the local people, and it seems to work pretty well.

The organization of what we call our ground-service, that is, this very considerable body of local wardens, was the first thought and care, and it is still our principal thought and care for the reason, as I have stated, that fire-prevention, rather than fire-control, is at the bottom of our effort. Having gotten this organization fairly well going, we have begun to establish watch-towers and to maintain patrols. No part of the service has gone nearly as far as we hope to develop it. As in every state, the money does not come fast enough; but working in this way I think I may venture to emphasize the point that it does not do a great deal of good to set patrols or to establish watchers before there is somebody at the end of the telephone-line to respond to a call and take care of the fire after it has been found.

As the work developed, we have experienced what practically every other state has experienced, an increase *apparently* in the number of fires. Let none be discouraged if he finds upon the extension of his forest-fire service that the number of fires grows and grows. It will grow, it is bound to grow, until the service is fully established. Such a record does not mean that your fires are increasing, it only means that you are beginning to get a complete knowledge of them. Years ago some efforts were made to count the fires in New Jersey. The record shows sixty or seventy or eighty fires a year and the average area burned was upwards of 1000 acres. Only the big fires were noticed. We now record between six and eight hundred fires every year, on only two million acres of woodland. Our consolation is that the proportion of serious fires is decreasing. Last year 27 per cent of all the fires were stopped before they burned two acres, 57 per cent burned less than 10 acres, and only 11 per cent covered over 100 acres. We believe that a service which gets men at every fire quickly and holds it to small proportions is as much as can be hoped for yet. I do not like it that the number is maintained as it is, the fires ought to be fewer; but if we keep the size down, and the size is continually going down, the loss, however you measure it, is less and less year by year.

It used to be said that our fires burned for weeks without attention. I guess that is pretty nearly true, but the average total area covered by the fires in the state for the last ten years has been about seventy thousand acres a year, or three and one-half per cent of the total woodland. In one view that is not very bad because the same ground often is burned repeatedly, in another view it is bad because if we burn three and one-half per cent of our woodland every year we have no assurance that any part of that woodland is going to escape burning within a rotation. Until we get the hazard down to where we can assure the maturity of the trees that we are trying to protect the effort is only partly successful. And still I do not count the situation discouraging, although it may sound o. We must be patient, perhaps safeguard one area at a time, and by degrees reduce the three and one-half percent of our woodland, or the woodland of any state, that may be subject to burning until every body of forest shall have immunity until the young trees can be matured.

The cost of the service, as I have outlined it, has grown from five thousand dollars a year, which was the first appropriation I think, not more than that anyhow, to about forty-four thousand dollars. Of that the townships pay one-half the expenses of the local firewardens, that is half of their retainers, and half of the actual cost of helping in suppressing fires, the state pays the other half and all the costs of supervision, clerks, printing, etc. The total is equivalent to two and one-half cents an acre a year on the woodland that we are covering. It is a pretty high rate; if it were insurance we could say it was a low rate Counting the thing as it is, it probably is not enough. I know it is not enough to bring us to the point of fireproofing the forests, which is what we aim at.

Now, for all this, what is the accomplishment? Mr. Pinchot said yesterday that he felt a very large proportion of the fires in Pennsylvania were set intentionally, if not deliberately incendiary. In our experience that is almost unknown. Most states charge the majority of the fires to railroads. When we began we regarded between fifty and sixty per cent as attributable to railroads. Last year, and every fire of that kind is recorded, only thirty-five per cent of all our fires started from the railroads. Brush-burners, smokers and those who traverse the woods are responsible for the most of the fires started in our territory. To the improvement of the condition with respect to the railroads we have, in very large measure, the railroads themselves to thank.

Our cooperation with the railroads in the matter of fire-lines and cleaning up the right-of way has been referred to. We established that principle by law in 1909, and every railroad in the state but one fell in with us to make fire-lines by clearing strips one hundred feet wide on each side of the tracks and outside those making belts ten feet wide stripped bare to the soil. One of the roads, through a property-owner, fought the law and the courts declared it unconstitutional. Now, here comes the pretty part of it. Pending the controversy some three hundred miles of fire lines of the standard type were built by the railroads. Since the law was thrown out by the court not only has every mile of that three hundred been maintained voluntarily by the railroads, but they have added fifty per cent to it, and are still going. Every now and then one of the railroad men comes in and says "we can not get across that man's land down there, he won't let us clean up, could you help us?" Fortunately we have another law by which anyone who maintains a nuisance of that sort can be required either to clean up or to put on a patrol at his own expense.

So much for the railroads and their fire-lines. The thing we are proudest of in this connection is our success in fixing the responsibility for our forests fires. It is not that the penalties imposed are specially important, but that the convictions show where the danger lies and help to prevent other possible violations. Last year responsibility for sixty-two per cent of all the fires that occurred in our state was fixed upon some person or agency. The penalties are made to fit the crime in each case. The railroads are never charged more than the actual cost of controlling a fire, because it is recognized that their acts are involuntary. If an offense is malicious, or due to extreme carelessness, the offender pays a heavy penalty. The law allows up to four hundred dollars. If a violation is due to ignorance or if some poor devil in the woods has hard luck while trying to clean up a little place to live on the penalty may be purely nominal.

In another way we are getting ahead. Whereas in the old days our fires burned for days and weeks, they now are literally matters of hours, with a very few exceptions. Once in a while one gets away, and in some sections of the state it is still possible for a fire to burn for hours without being known, but that is getting rarer and rarer. I think we have the absolute and complete support of the public. There was the usual opposition and criticism when we began, but that seems to have vanished entirely. The townships do not object to paying their share of the cost. They urged us, as a matter of fact, to increase the pay of the fire fighters last winter and are ready to hold up their end. It seems to be pretty generally accepted that something of material value to all interests will come out of the effort. I hope that that expectation may be realized.

There is one thing in this connection about which I must express envy of Pennsylvania and New York and a few other states, concerning the possibilities perhaps more than the actualities of fire-control and that is your state police. It surely is the only practicable dependence in some of the far western sections, as it is of the greatest value where there is a constant menace from all sorts of sources—streams of people, hunters, automobilists, flower gatherers or what you will. We have so many that the only sure way to control them successfully is to have somebody continually on their trails. There resides I think in a state police organization very great possibilities in this direction. Unfortunately we have not yet got it, but my hope is that we shall have one before long. It can do much to lesson the hazard by covering the frequented forests during the danger seasons. What may be expected is indicated by an experience several years ago. There happened to be a little money available at the opening of the deer-hunting season. As I have told you, the hunters pour out of the cities during the few days when hunting is lawful. We served notice that hunters building fires illegally would be arrested, but they did not believe there was anything in that. Just four patrolmen went around the deer grounds after dark, and in two nights they rounded up one hundred and thirty-six deer parties building fires in violation of the law. The violators were not penalized very much, most of them paid an insignificant fine, but we said, "you are watched". Next year a similar patrol found not a single fire illegally set, but practically every deer hunter went hunting in an automobile and with an oil stove. That is sport, if you please!

Gentlemen, I have tried to outline what little Jersey has done in the way of safeguarding two million acres or forest which has nothing important in the way of matured timber, but which has great potentialities, because of its location and the productive quality of the land. On this account we are convinced that, mainly through fire-protection, there can be built up a forest which will have great value to those who come after us. (Applause.)

The CHAIRMAN. Mr. Gaskill will be succeeded on the same subject by Mr. M. C. Hutchins, of Massachusetts.

Mr. M. C. HUTCHINS, Massachusetts. I have been asked to give an outline of our state-wide forest fire protection system in Massachusetts. I have listened with a great deal of interest to the remarks just made by State Forester Gaskill of New Jersey, and if I were to touch on the fire menace or fire conditions in Massachusetts, I would simply need to repeat what Mr. Gaskill has told us, as conditions in Massachusetts and New Jersey are somewhat similar.

The present system was started in the fall of 1911, legislation being enacted that year calling for state-wide fire protection. In fact nine years ago at this time we were constructing our first observation station at the summit of Grace Mountain in the town of Warwick, and within five miles of New Hampshire line. The state was divided into five districts, each comprising around seventy towns, each district being under the supervision of a district forest warden, who was provided with an automobile and necessary equipment for handling and small fire. It is their duay here, that in selection of our district forest wardens, we have not adhered to fires, and to urge upon them the necessity of providing themselves with necessary forest fire fighting equipment.

We have thirty-seven observation stations, thirty-two of which are steel towers from thirty-eight to eighty-three feet high, according to the location, and topography of the country. Twenty-six of these towers are equipped with fire escape stairs, and six with ladders. The total cost, including the erection, is $33,000, and the towns receiving the benefit from these towers have contributed $14,000 of this amount. All stations are equipped with field glasses, sliding map tables, and topographical maps, which give the location and telephone call of over eighteen hundred forest wardens and deputies throughout the state. The construction work of towers has been done entirely by our district men and observers. I might say right here, that in the selection of our district forest wardens, we have not adhered to the policy adopted by many of the states in selecting foresters for this position, and the reason for this is that the fire menace in our state is so serious that it needs a man specially trained in the handling of fires to make a success of it. We therefore selected some of the best fire department chiefs, together with experienced telephone and map-making men for the positions. This gives us a type of man that with very little training could go ahead with our entire construction problem, so that for the past eight years it has not been necessary to engage a single outside man for this work.

The matter of having a closed room at the top of the towers is very important, and I have found that if we are to expect results from our observers we must give them a protected room to work in. The equipping of our towers with stairs has made it possible for more that thirty thousand people to visit them annually, coming from every state in the Union and from many foreign counties. For instance, this year at our Mount Everett Station, which is located in the most desolate part of the state, being in the southwest corner, we have had more than thirteen hundred visitors from twenty-two states and five foreign countries.

All our towers have a complete set of the bulletins published by the department, and anyone interested may procure similar copies by leaving their address with the observer. Most of our observers have been with us many years, and make it a point to give the visitors a good talk on fire prevention. The matter of selecting observers is a very important one with us. We prefer a local, middle-aged man, who has either lived in the locality a number of years, or who has been a frequent hunter or trapper in that vicinity, so that the information he has gathered in this capacity, together with our triangulation system in the station, make it possible for him to locate fires very accurately and quickly. The matter of accuracy is very important, as we have three hundred and fifty-three towns and cities within so small an area, and an observer must be so familiar with town lines that he will know just what town the fire is in.

The cost of a fifty foot tower made of 4 x 4 angle iron, with stairs and an eight foot room at the top, all complete and ready for use is about $1,200, and a seventy-five foot tower with 5 x 5 angle iron all complete is about $1,600. This does not include the cost of erection, which, as I have said before, is done entirely by our salaried district men and observers. We have had considerable experience with the cheap wind-mill tower, but they have not proved satisfactory—in fact they are not heavy enough to carry stairs and the closed in room at the top. The expense of erecting is nearly as much as one of the heavier towers, so that practically all the extra expense is the initial cost in the purchasing of a better grade tower.

Our fire fighting corps are generally organized into crews of eight: Under the old system, whenever a crew arrived at a fire it was natural for each man to select an extinguisher and immediately turn it over; consequently, before three hundred feet of fire line had been extinguished, these extinguishers were empty, and nothing had been accomplished. We say to them now, let one man discharge the extinguishers, three men keeping him supplied with full ones, and the balance of the crew follow along behind with wire brooms, rakes, shovels, etc., and see that any live fire is pushed back into the burned area and fire line established. One extinguisher will last about two minutes and will deaden the fire line a distance of two hundred feet in length and thirty feet in depth. This accomplishes the same results as throwing sand and dirt, only it is done so much quicker and easier, and with two or three crews working on a fire in this manner, any ordinary fire is under control within a very short time.

We have what is known as the town forest warden system. The selectmen of each town are required to appoint a forest warden during the month of January. This appointment however, does not become effective until approved by the State Forester. This system is in a measure satisfactory, as it places the burden of responsibility on the towns, who are liable for all bills for extinguishing fires. It is the duty of the town forest warden to divide his town into fire districts, appointing a deputy who has supervision over his district. The town forest warden has full supervision of the fire work in his town. It is his duty to issue all permits for fires in the open air between the first day of March and the first day of December. He has supervision and care of all forest fire fighting equipment purchased by the town, and he and his deputies have the necessary authority to make arrests of persons violating the fire laws.

In 1910 a law was enacted in Massachusetts known as the reimbursement act, which really established a workable cooperative plan between the towns and the state, which has been of immense value to us in the building of our present system. This law requires that the state shall reimburse all towns with a valuation of $1,750,000 or less, fifty percent on any forest fire fighting equipment purchased by the town and approved by the State Forester. In no instance does the state reimburse any town more than $250. In other words, the town may purchase $500 worth of forest fire equipment, and the state will pay $250 of it. We have had during the past ten years, 182 towns, covering nearly two-thirds of the land area of the state, come under the provisions of this act; 42 of these towns have taken up their entire allotment; 13 have had their valuations increased, so that while they have taken up a portion of their allotment, they will not be allowed to take up their entire amount. This leaves 127 towns that are still building up their town organizations and purchasing small amounts of equipment each year.

In many of our smaller towns we have gone still farther than just the control of forest fires, and are organizing fire companies that will also handle all building fires. This, we find appeals to many of the small hamlets, and at the same time assures us of the necessary equipment for handling our forest fires in these towns.

The state and towns have expended up to the present time $47,000 for such equipment, the state's share being $23,500. This has made it possible for us to have over 10,000 pieces of apparatus and tools distributed throughout the poorer and thinly populated towns, and where the majority of our forested area lies. This equipment is ready for immediate use.

The equipment that we recommend includes the ordinary three-gallon house extinguisher, one-man and two-man pumps, necessary shovels, wire brooms, pails, water cans, etc., and also motor apparatus for providing means of getting to the fires promptly.

We are asking for an amendment to this law so that we may reimburse towns $50 per year for the replacement of destroyed or worn out equipment. Other laws that were on the statute books were, the permit law, locomotive spark arresters, and the right-of-way act, all of which were very essential in the building of our present system.

With the above organization and the observation system, we have been able to reduce the fire loss from over $600,000 per year in 1911 to an average of less than $100,000. This year our loss will probably be around $60,000, and our number of fires will exceed 1,800.

I want to say just a word about railroad fires. I do not want my friend Gaskill to leave the impression here that he has all the locomotives over in New Jersey, as we have 1,500 in operation in Massachusetts every day of the year, thirty different lines coming into Massachusetts from outside of the state. A system of inspection is carried on by our department and members of the Public Utilities Department, which covers all Massachusette locomotives. These inspections are made in the early spring and fall before the fire season starts. Our chief trouble today is in locomotives coming from outside the state over these various lines where no inspection is made and very little attention is paid to the front ends and ash pans. In fact it has been necessary for our Utilities Department to prohibit certain locomotives from coming into the state without their approval as to the condition of the spark arresters and ash pans.

The advisibility of closing the hunting season has been mentioned, but I want to say that we have had our troubles with hunters' fires. In 1914 more than four hundred fires were set the first week of hunting, the Governor then closed the season. This year we had one hundred and sixty-five fires the first three days of hunting; the season was then closed for four days until we had heavy rains.

Mr. LOVEJOY. May I inquire what the cost per acre is for this protection, if all the legitimate items are charged in?

Mr. HUTCHINS. You mean fire-protection.

Mr. LOVEJOY. Yes, the total cost of protection, per acre on the acreage protected.

Mr. HUTCHINS. The forested area in Massachusetts is scattered more or less over the entire state, therefore, our state laws require state-wide fire protection. The total area of Massachusetts is a little more than 5,000,000 acres, but we have about 3,000,000 acres of forested area or potential forested area. If the cost of fire protection were distributed over the entire 5,000,000 acres, it would be about 1½ cents per acre. On the other hand, if this cost is charged only to the actual forested area, it would be about 3 cents per acre.

Mr. LOVEJOY. With everything legitimate charged in, depreciation of property, volunteer labor, and so forth?

Mr. HUTCHINS. No. This estimate does not include depreciation of property. It includes our state appropriation, money expended by towns for fighting fires and the purchase of forest fire fighting equipment, and money expended on our state reservations for fire protection.

Mr. LOVEJOY. Does that include the volunteer labor contributed?

Mr. HUTCHINS. No.

Mr. PETERS. Is that based on your whole forest area of three million acres?

Mr. HUTCHINS. No. The 3 cents per acre is based on our actual forested area of 3,000,000 acres.

Mr. PETERS. It means less than that.

Mr. HUTCHINS. It means a cent and half an acre on the total acreage of the state in order to cover the forested area.

Mr. PETERS. Four cents of the forest--area protected?

Mr. HUTCHINS. Yes, practically that.

Mr. PETERS. May I inquire how nearly you have reached what you consider the practical ideal of protection?

Mr. HUTCHINS. We feel that our observation system is nearly complete at the present time. It will be necessary to establish two or three more towers in order to cut our radius down to not over ten miles in some of our dangerous localities. When this is done, and our present slash law is enforced throughout the entire state, we will have accomplished about all that is possible under our present laws.

Mr. PINCHOT. What would you figure would be an ideal sum that would give you really the sort of protection that you want per acre?

Mr. HUTCHINS. Figuring on the actual forested area, I would say that between 4 cts. and 5 cts. per acre would give Massachusetts an ideal protective system.

Mr. PINCHOT. May I ask you just what you mean by very good protection?

Mr. HUTCHINS. We have an average of about 2,000 fires per acre. Before our present system was installed, the average area burned over per a fire was nearly forty acres. The average damage per fire was around $225.00. Through the present system, this has been reduced, so that the average area per fire at the present time is around thirteen acres and the average damage per a fire is about $40.000. This is about all we can expect from our present organization and the appropriation we are receiving today for this work. If this appropriation could be increased to between 4 cents and 5 cents per acre of forested area, I think it would allow us to perfect our organization so that our average area per fire would be between eight and nine acres, and our average damage per fire would be around $20.00 or an average loss per year of not more than $50,000. If the loss could be reduced to the above figure, I would consider that we had an ideal system.

Mr. PINCHOT. That means how much in proportion to the total area? What is the ratio, so that we could apply it to other regions? Is it one hundred and fifty thousand against fifty millions, or what sort of a ratio?

Mr. HUTCHINS. I can tell you that exactly.

Mr. LOVEJOY. I would like to ask Mr. Peters: Is there any state that has a more intensive or a more successful fire-protection system than Massachusets?

Mr. PETERS. I think that some states have better systems in certain respects. None has a lookout system any better than that of Massachusetts.

Mr. LOVEJOY. Has the reduction of fire losses been more successfully carried on in any other state?

Mr. PETERS. New York and New Jersey have reported the loss of one dollar or less per acre. I do not know of any states that can beat them when you come right down to actual dollars-and-cents results.

Mr. BESLEY. A dollar an acre on how many acres of area?

Mr. PETERS. On the acreage burned over.

Mr. BESLEY. I was very much impressed by the exact data with regard to the damage per acre of land burned over. I do not think it is any index, or a suitable index at least, of the damage from fire. I can not understand exactly from Mr. Gaskill's figures whether the woodlands in New Jersey were so much less valuable than they were in other states, or whether they are estimated on an entirely different basis. I think in Massachusetts they figure the average loss per acre of forest-land burned over, at four or five dollars an acre.

Mr. HUTCHINS. Around five dollars an acre.

Mr. BESLEY. I think it really ought to be placed on the actual acreage burned over. That is the only way you can get at any fair estimate of the results of fire-protection in this state, and in comparing it with the damage per acre of forest-land.

Mr HOLMES. I would like to ask Mr. Hutchins whether he can not expect to decrease the number of fires in Massachusetts by education and other means.

Mr. HUTCHINS. We are working along this line at the present time. Just how much can be accomplished, is hard to say. With our immense population, it is impossible to reach more than a small percentage of them; then you take our immense railroad system, our 250,000 automobiles and trucks, 150,000 hunters, and our extremely large foreign population, and the fact that ninety-five percent of our fires today are caused by carelessness, the future for reducing the number of fires does not seem very bright.

Mr. SECREST. On what basis is that estimate made?

Mr. HUTCHINS. This estimate is taken from our reports of the actual damage, received from our fire wardens. There is some question about it being very accurate, owing to many of our forest wardens not appraising brush land as being of any value.

Mr. PETERS. This question of assessing fire-damage is one that I would like to see the states take up a systematic manner. The figures come to the Forest Service from the states, and we are forced in assembling them for statistical purposes to enter the damage as reported. If we tried to harmonize these figures, we have great difficulty. In fact, we can not harmonize them; we simply can put them down as reported and leave it to the person who scans the statistics to do the harmonizing. Now, you can see what a discrepancy there must be between New York's and New Jersey's estimates of around a dollar an acre and Massachusetts' estimate of five dollars an acre. This is something I would like to see the states consider.

GOVERNOR OLCOTT. It seems to me there is very great discrepancy there.

Mr. PETERS. I believe that the method of estimating should be standardized. If this could be brought about it would be of considerable benefit to those of us who are interested in getting a line on the actual results in fire-protection.

Mr. WILLIAM P. COX, State Forester, Minnesota. If I may say a word regarding that, our instruction to the rangers in assessing fire-damage has been of this nature, that no merchantable timber, of course, would be appraised at its real value, which they could determine, and that the young growth was to be figured on the cost of replacement, and, of course, on grazing-lands very often we ignore fire-damage.

Mr. SECREST. That is probably applicable to standing timber destroyed outright. Fires very frequently occur in Ohio woodlands which do not destroy the second growth stands, but scar the trees in a manner that with the subsequent entrance of decay may seriously affect the quantity as well as the quality of the timber eventually produced.

Each ground fire sweeping over a woodland causes damage to the timber, and to the soil in various ways, although it may not be apparent at the time.

How are you going to assess damages in such cases?

The CHAIRMAN. It seems to the chair that matter is absolutely one of speculation. If there are no other questions—

Mr. W. G. HOWARD, Assistant Superintendent of Forests, New York. It seems to me that you can not make any hard and fast rule in determining this fire-damage. It has got to be fixed by the man who has charge of the fire, or by someone inspecting the burned-over area after the fire is out. It varies so much. We have had fires that have done damage to the extent of one hundred dollars an acre, where they have destroyed virgin timber stands ready for market. We have had some fires, notably this past year, which because of weather conditions and conditions of the ground, burned lightly over the ground, and twenty-five cents an acre is easily the entire measure of damage caused. It varies so much in different instances that it seems to me impossible to lay down any hard and fast rules.

The CHAIRMAN. The gentleman is entirely right in the opinion of the chair.

The next gentlemen to address the convention will be Mr. George H. Wirt, of Pennsylvania.

Mr. GEORGE H. WIRT, of Pennsylvania. Mr. Chairman, I realize the position that any man is in that has charge of the fire-work in a state and is asked to explain that work to a bunch of foresters and to do it in twenty minutes, an hour, or even ten hours and twenty minutes. Without going into the details as to the whys and the wherefores, which all of you know, I simply want to refer very briefly to the organization which we have in Pennsylvania, It is the result of an evolution which started along about the time of William Penn, and is not finished yet. In other words, we do not have in Pennsylvania everything we would like to have, just as Mr. Gaskill has said and as Mr. Hutchins has said they do not have, but which they are naturally looking for in their own respective states. This evolution that has proceeded in Pennsylvania in regard to the protection of forests from fire, started, as I suppose it did in both of your states, with the unorganized force made up largely of the individuals who happened to hold land and whose land was either being damaged or subject to damage by forest-fires and the few friends that they could get together with them in time of emergency to extinguish the fire which happened to get started. From that in Pennsylvania it developed into an organization of so-called ex officio forest fire wardens, being the local officials. These men had been saddled with extra duties in addition to the duties for which they were locally selected. Township supervisors, road men and township and borough constables were at different times so designated in our laws as ex officio forest fire wardens. Where these men were more or less conscientious, more or less appreciative to the oath of office to which they subscribed, and observant of the duties that were placed upon them by law, some measure of success in the protection of forest from fires was accorded; but, unfortunately too many of these men did not know anything about forest-fires and how to extinguish them, and cared less. The result of the whole scheme was that, taking the average over the state, it was serious, and the owners of land had little or no protection over and above what they and their friends afforded to their forests. There were some remarkable instances, of course, where forest-fires started, and people having the community interests at heart got together and protected the forest of a community without regard to ownership. Previous to 1909, still with this ex officio organization, there grew up in Pennsylvania different systems, by reason of which men were paid for the extinction of forest-fires. I can not give you exactly now—it makes no difference—just when this idea of paying for fire extinction began, but it was pretty early in the game, I think co-equal with the placing of the duty upon the township supervisors and constables. It began at least with the idea that the county should pay both the officers and wardens and the men who assisted them. The first grade of pay for the people who assisted the wardens was rather high at the time in proportion to the rate of wage then existing generally over the state, with the result that there was a continuous agitation that men and boys and perhaps others were setting fires in order to get the compensation for fires extinction. That rate was finally reduced. All of these expenses for fire extinction, to start with, were paid by the county. Then plan after plan came in from the county commissioners, and gradually the legislature made arrangements that a portion of the expenses should be borne by the commonwealth, the county paying it out in the first instance and billing the commonwealth for various percentages, the percentage to be paid by the commonwealth constantly increasing. This arrangement provided in no way for supervision by the Department of Forestry; consequently, there was little or no chance of keeping any kind of tab on what was done or of giving the results to any state organization.

In 1909 the legislature made it possible to do away with the ex officio fire wardens and establish a system of wardens directly responsible to the Department of Forestry; the idea being that there should be a so-called district fire warden in each township and borough, and this fire warden to have authority to appoint as many assistants as he wanted. There was no way of making these appointments except as recommendations were sent to the department, and without going into any further detail you may guess how these recommendations were made. The appointments were made, and sometimes we got good men by chance, most of the time we did not. Let me say this, however, that this system of appointments and the organization as created under the act of 1909 was somewhat better than the ex officio organization; but the great defect in 1909 organization was, first, that there was no means by reason of which the department could check up the individual men who were recommended and who subsequently received appointment just the same, nor was there any method of supervision of the men who were appointed. In 1914, without going any more into details as to the historical proposition, we began to do something towards checking up the wardens appointed under the 1909 act. By that time we had a number of state foresters located on state forests in twenty-six different counties of the state, and we directed the foresters to take under their supervision all of the fire wardens within their convenient reach and to do this work in connection with their activities on the state forests. The result of this inspection and checking up of forest fire wardens by the state foresters was so beneficial that it was positive evidence that what we needed in the whole organization was just some such plan, and by various means the 1915 act was finally approved by the legislature, which made it possible for the Department of Forestry to begin at the bottom and really create a new forest-fire organization. As I told some of you men who were at Washington when we began the real re-organization under the 1915 act, we found men who had been dead four years still listed as forest fire wardens, and, as some one said, possibly some of them are still fighting fire. Well, we got rid of all the dead wood, I think, in the first year after the new law went into effect. We dismissed probably sixty per cent including, of course, the dead ones, getting that many names off the list, and substituting real, live, wide-awake men who were interested in the protection of forests from fires. One of the things which we desired to do in the 1915 organization was to find men who were interested in the proposition from an individual and personal standpoint, and not simply through the proposition of the amount of money that they might possibly get out of it. As the second feature of the 1915 organization we provided for inspection for I am thoroughly convinced that no organization, no matter how good the men may be in the field, can produce the results that we want them to produce without careful, frequent and constant inspection of activities, and with that inspection the keeping alive of interest which the men may have had when they started, but which, by reason of all sorts of discouragements which you all know come to the man who is interested in forest fires, may gradually diminish, and in many cases it is diminished unless there is a constant stream coming in from some one place, coming into his life and keeping him up to the highest pitch. With that idea we provided for the districting of the state, each district to be under the supervision of the district fire warden, whom the law specifically designates shall be a forester. Up until the recent change in our administration of the Department of Forestry in Pennsylvania that portion of the law was never put into complete effect, but under Mr. Pinchot's administration we have finally divided the state into twenty-five districts, and each district is now in charge of a district forester having under his supervision anywhere from sixty to one hundred and eighty forest fire-wardens. The district forester is made responsible for the appointment, the choosing of these men, the recommendation of them, and their general efficiency in the field. We have something over two thousand forest fire-wardens, including foresters, state forest rangers and game wardens. All of the game wardens are made forest fire wardens. The state police in Pennsylvania are made forest fire wardens, although we do not list them individually in our list of wardens. We have the very closest cooperation with them. Mr. Gaskill referred to the matter, and we feel very proud of the work which has been done by our state police independent of all organizations and cooperating with our organization. We feel, and are working on the principle, that every acre of forest lands can be put in a position, or in a condition, by reason of which it receives a reasonable amount of protection from forest fires. Therefore there is no limit to the number of fire wardens whom we may appoint in the state. In a great many places we have probably considerably more wardens than would be absolutely necessary for the forest conditions prevailing in the community, but as long as we do not have to pay them twenty dollars or ten dollars a year it makes no difference so far as expense is concerned, because our wardens are paid only while they are in actual service, or on actual duty assigned to them, or which arises in the case of a forest fire starting. We do not limit the appointment of forest fire wardens purely and simply to forest communities, for we feel that every man, woman and child in Pennsylvania is a prospective or possible user of forest land, and we use our forest fire wardens, the whole forest fire organization, not only for the control and extinction of forest fires, but to develop in every community of the commonwealth a healthy public spirit against forest fires. And stressing prominently again, as Mr. Gaskill has stated that they started out with the ideal thing, there was the idea of prevention of forest fires. Consequently in the southeastern section of the state, where there is very little else than small woodlands, and in the southwestern section of the state, which has more or less of a similar character in relation to farm lands, we propose to have a sufficient number of forest fire wardens that these men in their respective communities will develop a healthy attitude toward forests and against fire. In connection with the development of this state-wide forest-fire organization we are also developing a state-wide system of observation stations and towers. As is the condition perhaps in your respective states, so the condition has been here; we have not been able to develop these towers by any means as rapidly as we would like to, although I am very glad to say "Amen" to what Mr. Gaskill said in regard to the erection of towers previous to the time that we have the right kind of public sentiment in the community to make the tower effective. I feel there is a relation between the erection of towers and public attitude. You have got to develop the public attitude before you erect the towers to make the thing work. The proposition is a simple local proposition, and we must deal with it according to the people, largely the people rather than the forest conditions which exist. With the towers, of course, we are developing the telephone system. I can not tell you off-hand how many of the forest fire wardens have telephones in their homes, but one of the propositions that we hold out to the forest fire wardens is that the men shall have telephones either in their homes or at least available within a short distance, if there is any telephone line at all in the district. We have in Pennsylvania unfortunately a great many districts where there is no telephone service, and in such districts we must have our own, of course, as part of the state equipment; and that we are working on, using the state forests, which you see here marked in green, as a nucleus around which those systems will be developed. We, of course, must have the best kind of telephone communication with our foresters, both from the Harrisburg office to them and from the foresters to their rangers, and then from the foresters to the forest fire wardens, and so on down through the line.

I might stop here just a moment to go back to the personnel question. In our scheme we have constantly from the beginning induced our wardens to develop local forest-fire crews, picking out the best men of the community whom they find, and whom they can induce to join with them in this forest-protection work, and to keep them together as a center around which the other volunteers, or the ones who are compelled to go fight fires, will work on the fire-lines. We believe that the organization must be state-wide, must consist not only of the higher and the controlling officers and the inspectors, and then the fire-wardens, but the organization must also include the individuals in the respective communities who are going to help the fire-wardens right out on the job when a fire occurs. We are endeavoring to get just as many of these forest fire-fighting crews organized as it is possible to get together.

This leads then directly to the matter of the development of cooperation with any kind of individual organization, or what not, that the foresters or the fire-wardens might find of value in their communities. I will say here, as Mr. Pinchot referred to the matter yesterday, that we have gotten the most splendid cooperation from our Boy Scout organization in this state. There have been several instances in Pennsylvania this spring where if it had not been for the support given the fire-wardens by the Boy Scouts of America, I do not like to think what might possibly have happened. They have been splendid boys and scoutmasters in the protection work and have been of splendid help to us. Mr. Pinchot told you of the organization of the Forest Guides which we are developing through the Boy Scout organization. We have given them a very nice little button. It was my pleasure the other night to give the buttons to thirty-two scouts of one troop here in the city, and to say something about the importance of protecting forest from fire, and to tell them what the organization means to them and to us. I was very much gratified the next morning to meet the father of two of the boys of the troop and have him tell me what the boys told him when they went home that evening. So that is just one instance, and if it happened in this instance, I have every reason to believe that the same thing will happen in many other instances, for the boys went home and the parents wanted to know what this button was. The purpose for which this work among boys was started was, of course, accomplished. In addition to that, one of the boys to whom I gave a button the other night said, "I will have a dickens of a time explaining to the boys at the Technical High School what this button is for." I said, "Go to it, that is just what we want you to do." The result of it is there is a mighty big publicity proposition. I do not know whether it will be like the bone-head from Salem, Oregon, but it will go a long way to put the publicity in the hearts and minds of the people we want to reach.

In addition to the towers and telephone lines which we are planning, we have done very little in the way of furnishing our men with equipment, not because we have not wanted to. but because we have not seen our way clear for financial or other reasons to place equipment in the hands of the forest fire-wardens. Personally I felt there was great risk in placing equipment in the hands of wardens until we had our inspection system in such shape and condition that the inspectors or district foresters could keep tab from time to time on the material furnished. Judging from past experiences with state-owned equipment and publicly owned equipment, it was a very easy proposition for the individual who happened to get a hoe or rake on the fire-line to very quietly take it along home with him or drop it in the brush where he could conveniently find it the next day, and the result of it was that the tools were used on the neighboring farms instead of being ready for the next forest-fire.

Now, with our inspection system complete, I am very anxious that we begin to develop complete tool-sets for all of our men. We furnish, or have furnished this year to some of our foresters, in fact I think we have sent a set to each district forester, some rakes, some torches, some axes, one cross-cut saw apiece, and a few other smaller tools. There is just one little tool that we have developed in Pennsylvania that I would like to call your attention to, if I may. It may have some interest to you even though you do not agree with our back-firing methods in Pennsylvaina. It may be of value and of interest to some of you other men, and even Mr. Hutchins and other men in Massachusetts, a little wooden rake—you saw it on the table in the department—with four or six teeth in it, and a very short handle. It is so cheap that it does not make any difference whether a fellow carried it home or not. In case he does take it along home it is an encouragement to somebody to make one like it, and at any rate he will have it ready for the next fire. This rake is useful in cleaning a trail in front of a fire, either to stop the original fire or to rake a trail from which to start a back-fire. I would like to call your attention to the new forest-fire tool which we have developed as the result of the fertile mind of one of the fire-wardens. It is known as the Rich forest-fire tool, and we think it is the best thing available in the forest-fire equipment for Pennsylvania at least. Of that also a sample is on the table in the Department of Forestry, and you can see it there.

Probably the best way in which you can get an idea of the state-wide organization which we have in Pennsylvania is to look at the forest-fire map which we have in the department, showing the location of the fire-wardens, observation stations. and so on, which is also up in our department, if you have not already observed it. We have indicated there by pins the location of all our fire-wardens, the location of all of the towers we are now using, and that is a mighty valuable map in the forest-fire game, especially during the forest-fire season. I am not going any further into the details of our organization unless you ask me some questions in regard to it.

Just a point in regard to the ideal for which we are working in Pennsylvania, or at least the ideal which we are trying to tell our fire-wardens, and which will answer a number of Professor Lovejoy's questions as to what we think is the ideal for Pennsylvania; also just to give you a few figures as to what has been accomplished under a comparatively small appropriation for a state where we have at least ten million acres of forest-lands to protect, and where we also have some railroads, and some hunters, and a few other fellows who are careless with their fires. We have in the ordinary course of things too many of that kind, but we have got to endure them just as you fellows have, and it is our game to offset the unsatisfactory conditions which have developed and to make things right. In 1913, as far as the figures show that we were able to collect, the average forest-fire in Pennsylvania was something like three hundred and eighty acres. This fall the average fire was sixty-four acres. The average for the whole year this year will probably be close to one hundred and fifty-eight acres. Last year it was down to one hundred and thirty-four, but this spring we had a beautiful forest-fire season, and our average for the year may run a little higher than the average for last year, although I do not known yet, for the reports are not all in; but a drop in the average from three hundred and eighty acres per fire to sixty-four acres per fire I think is some slight accomplishment. It at least shows that with any kind of a decent fire-organization we can accomplish results. Now, the thing I am telling our fire-wardens, and the only thing I am holding up to them, is that we want to reduce the average per fire in Pennsylvania to ten acres. That is not a real ideal by any manner of means, but I do feel that if we can keep that in the minds of our men, and keep them on the jump, so that the average fire in Pennsylvania will come down, say, in the next ten years, and I hope it will before that; but if in the next ten years we keep the acreage per fire in Pennsylvania down to ten acres, I think we shall have accomplished remarkable results, and will put the protection from forest-fires pretty nearly where it ought to be in Pennsylvania.

Mr. BESLEY. I was just wondering about the financial situation. It would be of interest to me to know how much you pay your district rangers right on down for fires.

Mr. WIRT. The 1915 law provides that the chief forest fire-warden shall receive twenty-five hundred dollars per year. The law provides that the district fire-warden shall receive eighteen hundred dollars per year, although under the present arrangement of placing district foresters, by doing away with the term "district fire-wardens," simply having the foresters, under the general department as foresters, paid out of the department's funds, these men are receiving anywhere from seventeen hundred to two thousand; fifteen to twenty-four hundred dollars is the scale. The next men in rank, as we now have it, are the fire-wardens, who receive the magnificent salary of thirty cents per hour while on duty. However, if we employ or designate any of these forest fire-wardens as permanent observers at towers, we are authorized according to law to pay only fifty dollars per year; but by paying them as laborers, and by reason of the cooperation which we receive in the majority of cases through protective associations of the state or our friend, Mr. Peters, at Washington, we are able to pay these men anywhere from fifty to one hundred dollars per month. The men who assist the fire-wardens in the extinguishing of forest-fires we are allowed to pay anywhere up to twenty-five cents per hour for the time which they actually put in. The appropriation which we received for the work of the bureau of forest protection from the 1915 session of the Legislature, was sixty thousand dollars for two years; in 1919 we received ninety thousand dollars for two years. Does that answer your question?

Mr. LOVEJOY. I should like to inquire as to the cost of protection as you have it now, that is to say, the cost which you charge up. How much an acre?

Mr. WIRT. Taking the forest-land as nearly as we know at ten million acres, or practically that, taking the expenditure of the state as forty-five thousand dollars a year, which it averages, and considering the fact that private individuals unquestionably spend as much as we do, if not twice as much, you can figure out the cost yourself.

Mr. LOVEJOY. Would it be five cents?

Mr. WIRT. No, I do not believe we have spent, in fact I know we have not spent five cents; but five cents per acre is what we are hitting at, and that is in accordance with the request we are now making.

Mr. LOVEJOY. With five cents an acre of state money, and such an organization as you expect to have pretty soon, can you get your fire-loss down to one per cent of your area per year?

Mr. WIRT. I believe we can.

Mr. LOVEJOY. But that does not include the volunteer labor of the people in the woods and farms in protecting their own property, and so forth, what would be the total items of expense; individual plus state expenses?

Mr. WIRT. I say, Mr. Lovejoy, the proposition at the present stage of the game is like this, that if the state can get five cents per acre every year, say, on the basis of ten million acres of forest to be protected, and we can get that allotment or proportion for, say, whatever period of years it may be necessary in order to establish our tower-system and telephone-line system, and to place in the hands of our organization the equipment, more or less permanent, which we need, that then we can begin to drop back so that the state expenditures plus the private expenditure will not exceed five cents per acre. In other words, I feel that when we have our organization complete and our equipment complete we can safely count on complete protection at an expenditure of five cents per acre all told.

Mr. LOVEJOY. But,doesn't your "complete protection" involve a loss of one per cent per acre every third year?

Mr. WIRT. No, I will go even better than that. If we reach that stage of the game we are going to do better than one per cent. We are not going to have that much burned over. I also feel like Mr. Hutchins and Mr. Gaskill that if it is possible for us to have the actual number of fires on the increase, but the measure of the protection will be not necessarily in the reduction of fires; although I have great hopes in a considerable reduction, I am banking on it. I believe it is possible, because with the cooperation we get from the railroad companies this fall for example; and you may be extremely interested in knowing that we had a very small percentage of forest fires from railroads, less perhaps than any year for which we have figures. And I believe that with the constant and persistent development of the safety-strip movement along the railroads, and with the probable inspection of railroad locomotives, that we can cut thirty or thirty-five or forty per cent of the fires caused by railroads down possibly to five per cent of the total. But with that reduction in such causes we are altogether likely to have an increased number of fires from other causes, so that the total may be slightly on the increase for several years to come; also considering the fact that with the completion of the tower system, and patrol system, and perhaps an increased number of wardens, that we will come closer and closer to one hundred per cent report instead of perhaps ninety as I feel we get now.

Mr. HARRINGTON. Before this subject is closed up I would just like to have the benefit of the experience of the men in the East, in which states unquestionably these forest fire organizations are developed to a higher point. Out where I come from we would like to know just what effect high rates of pay have on the malicious setting of fires. Now, I understand that in New Jersey the rate of two dollars an hour up to two hours is paid. and after that fifty cents an hour is allowed. I was wondering whether or not that would not set up a tendency to maliciousness in the setting of fires, and really in a way the establishing of a sort of forest fire industry in a good many localities when work fell off. Mr. Wirt touched on that a little, and I was wondering about it. He mentioned that as having occured in this state several years back, and I would like to have the benefit of your experience in these states along this particular line.

Mr. GASKILL. There has always been a suspicion, even an assertion, that payment for extinguishing fires induced a certain class of people to set fires for the sake of the pay. That was one of the strong arguments made against our minimum rate. I am free to say that in the early days there may have been an occasional case of malicious fire-setting, but I am practically sure, that within ten years we have had not even a strongly suspicious case of that kind. The essence of the answer seems to be that with the right kind of supervisory organization, both with respect to the original appointment of the fire-wardens, and with respect to the inspection force there is little real danger of that kind.

Mr. WIRT. I heartily agree with everything Mr. Gaskill has just said. I feel that the proposition, the choosing of men, inspection, policing, judging from my own past experience with them, would be sufficient to check up on any difficulties of that kind. We did have one instance of it several years back, when we were pretty hard pressed for good men to fight fires, and some of the boys of the community were pressed into service; and without thinking as to what the results might be these boys were paid for their services, and were paid a rate which was almost as much as the rate for able-bodied men, with the result that we had some few incendiary fires in that neighborhood. Finally one of our state forest-rangers caught a kid setting a fire, and in his confession before the justice he owned up to the fact that he set the fire only to get the pay. With that knowledge in front of us we stopped paying the boys in the community. If they went to the fire they fought without pay. There is, of course, always that chance that some one might set a fire for the little bit of money that he gets out of it, but if you have wardens and the wardens are on the job, and see that the men do any kind of decent work, there is not much danger. I remember one instance that came to my attention in the last three or four years. There was a grave suspicion that a certain individual had been setting fires in order to get the pay for the work of extinction. Our forester got wind of it, and, of course, the next fire that occured this individual was one of the first fellows who was notified to go to the fire. I suppose you know we have in our law in Pennsylvania a compulsory provision, and if a man is directed to go to fight a fire he must obey. This individual was well aware of this fact. Of course, one of the foresters saw that he was put right up to the flame, and was kept there until the fire was out. From that time on to the present time, so far as I know, there has never been any suspicion raised against that man for setting fire. Some of those things the local men can do on occasion if suspicion arises, so that I believe there is no danger in an arrangement by reason of which a man may get a certain rate of wage for the work that he does in connection with protection from forest-fire.

While I am on my feet, Mr. Chairman, my attention was just called to the fact that I made a statement which was in error. I inadvertently stated that our patrol-men were paid one hundred and fifty dollars. As a matter of fact, they are paid from fifty to one hundred dollars a month, and the clerks will please make the correction.

Mr. HUTCHINS. Speaking about the rate of pay, some twelve years ago, during a bad fire in New York, I remember the rate of pay being increased as high as $1.50 per hour for labor, and it was a supposition at that time that this high rate of pay was the cause of many additional fires. In Massachusetts, we are paying our forest wardens an average rate of $.50 per hour at the present time.

Mr. W. J. MORRILL, State Forester, Colorado. We have a method of raising fire crews in Colorado which may be of interest to some of you outside of the national forest. The sheriffs are responsible for the extinguishment of fires. We have a method frequently employed for raising a crew which costs nothing, and, of course, we know the men that fight the fires also are not the fellows who set the fires because we have this very simple arrangement. The sheriff takes the prisoners out of the jail, loads them into cars, and he takes the whole crew of the petty prisoners out and fights the fire, and then he brings them back. I have fought on two fires at least where nearly the whole crew was made up of prisoners, and they fight well. They do just as well as hired help, and they all come back to jail. Of course, they have plenty of opportunity to escape. I once complimented the chief of police of Colorado Springs on the fact that about twenty men we had out on the fire all came back and he said, "Yes, I was very much disgusted that they did."

The CHAIRMAN. I would like to remind the members of the conference that the time is going on; it is five minutes of twelve. The next paper will be read by W. G. Howard, of New York, on "Special Fire Hazards."

Mr. W. G. HOWARD. Assistant Superintendent of Forests, New York. Mr. Chairman and gentlemen: Before proceeding to take up the topic which has been assigned to me, I would like first to comment on something which is closely allied to it. I do not feel quite as discouraged about the proposition of preventing railroad-fires as Mr. Hutchins seemed to be. I think they can be practically eliminated. I do not believe we will do it in a year. We had a good many fires in New York state this past year, but I do believe it is possible. We had a demonstration which showed that, with the proper organization and attention on the part of the railroad company, fires started by coal-burning locomotives can be prevented. It was on the Adirondack line where, for eleven or twelve years, the use of oil-fuel during the daytime in the summer months has been required. Last spring just before the opening of the fire season the railroad men came down to Albany and put a petition up to the public service commission, saying they wanted relief from burning oil, because it was impossible to assure themselves of an adequate supply of fuel for the season. We looked up that statement and found it to be substantially correct. Therefore, if the railroad was to be relieved at all we would have to let them burn coal, and we decided that after imposing every possible safeguard we would take the chance. We provided for a very rigid patrol, carefully checked up by responsible officials; and for fire trains to be ready at all times, and for the use of one of the finest type of locomotives, big superheater locomotives, equipped with a suitable type of spark-arrester, a thing which experience has shown was effective, and also equipped with a suitable ash-pan, the clearing of the right-of-way to be done as usual; because with the very great sums of money at stake, oil burning costing the railroads tremendously with the ordinary price of fuel oil, and this year what oil there was was very high in price. Because of the very large sums of money at stake the railroads put their best and most conscientious efficiency men in charge of keeping these coal-burners in good condition. As a result they operated throughout the summer, under one extension of time after another. They operated these coal-burners right through the woods in May and June and again in October, when we had some of the dryest weather, and the greatest fire hazard that we have had in a great many years. They set practically no fires. There were three or four reported, but we have no definite assurance that any of them can be directly attributed to locomotives. They might have been set by smokers or tramps along the right-of-way, or something of that sort. It just shows what can be done with the railroads taking the proper interest and putting the right kind of men in charge of it.

The title "special fire hazards" is rather general and might easily be construed to cover nearly our whole fire-protection system. However, my present intention is to confine myself to considering under that head a dangerous condition which may be created on forest-lands, and which increases the normal fire hazard. In this connection I will endeavor to make suggestions as to methods of control to be applied in each case.

Perhaps the greatest danger from carelessly started forest-fires exists along the railroads and highways and trails which run through forest lands. The danger from fires started by locomotives along the railroad lines is too well understood to need much discussion here. Our method of taking care of this situation in New York is:

First: To take care of the locomotives themselves, either by requiring the use of oil-fuel or by requiring the best known fire-protective appliances for ash-pans and front-ends of coal-burning locomotives, and to see that these are at all times properly maintained.

Second: To see that the railroad right-of-way is kept cleared of all inflammable material, for its entire length, to a distance of fifty feet each side of the track. Broadcast burning of the entire right-of-way at least once a year is required wherever possible. Lately we have induced the railroads to cooperate by burning over the entire right-of-way.

Third: The reduction of the fire hazard on lands adjoining the railroad right-of-way. This last is made possible by a provision in our conservation law which forbids the leaving of debris or slash from a lumbering operation within twenty-five feet of the outer edge of the right-of-way. This is a great protection to adjoining timberlands, and can be accomplished at little or no expense if the operator takes care to fell his timber away from the railroad rather than towards it.

The fire hazard along well-traveled highways is great, and it is increased when the brush is cut within the highway right-of-way, usually three or four rods wide, and permitted to lie on the ground and dry out until it forms the best kind of tinder to kindle a fire from a match or cigarette carelessly thrown out from a passing vehicle. Lumbering operations are frequently carried on adjacent to highways and the slash left along the edge of the road to create an extraordinary fire hazard.

These conditions are met by us with a provision in the law requiring the removal of any brush or slash not only from the highway right-of-way itself, but also from a twenty-foot strip adjacent it. It is customary for the town authorities to mow the brush and weeds along the highways at least once a year. We require that this material be disposed of, such disposal being usually effected by burning.

The cost of this is not great, nor is the cost to the lumberman of keeping clear the strip outside the right-of-way very burdensome if he goes at it in the right way. The results, however, are good enough to justify even a considerable expense, because of their effectiveness in fire-proofing adjoining timberlands, at least from the carelessness of those who travel the beaten highways.

These requirements apply, it is true, only to slash created by the owner of the land and not as the result of fires or windfall. Still, the greater part of the danger is taken care of.

There are, of course, many footpaths or trails where the restrictions governing the removal of slash can not be applied. However, it has been our experience that it is not difficult to convince the land-owner that it is to his own interest to reduce the fire hazard along any trail as much as can be done at reasonable expense. We have pointed out the advantages to be gained by clearing back brush and slash from a trail which passes through a lumbering operation, and we have found the lumbermen ready to cooperate by taking care of this danger.

So much for fire hazards along well-defined routes of travel. However, the average fisherman or hunter is not content to confine his wanderings to roads or even trails. The best fishing and hunting can usually be found in the more inaccessible parts of the woods.

This brings us to a consideration of the reduction of fire hazards on cut-over lands. We have a law in New York state which requires the lopping of the tops of coniferous trees; that is, the lateral branches must be cut off the top so that both the trunk and branches will lie close to the ground and decay more rapidly. This method of taking care of the softwood slash seems to answer very well in our north-woods forests. While it is true that the fire danger is not decreased for the first two or three years after lumbering, the hazard is rapidly reduced after that time because of the quickness with which decay sets in.

I would not recommend the lopping of softwood tops as a panacea under all conditions. Burning the slash is not practicable with the deep duff and dense forest conditions of our Adirondack region. Lopping is far less expensive and seems to fill the bill.

Our greatest concern at the present time is with the reduction of the fire hazard on lands which have been lumbered for both hard and soft woods. The hardwood tops, under our present standards of utilization, are huge and ungainly, and the question of what to do with such a slash is one that has troubled us for some time.

Any investigations we have made—and we had splendid assistance last summer from Mr. Austin Cary, of the United States Forest Service—have failed to show that the lopping of hardwood tops facilitates their decay materially, if at all. When left unlopped they cease to be a fire menace after five or six years. Furthermore, it is a fact that the lopping of hardwood tops is very expensive and we feel that the money required for that work can be spent to better advantage in other ways.

As I said before, probably ninety per cent of our forest-fires are the result of carelessness. Bearing this in mind, we naturally turned to some method of preventing the starting of fires in these bad lumber slashes, with a provision for attacking promptly any fires that might be started. At the present time we are now considering presenting the following plan to the next session of the legislature, with a view to securing the necessary amendments to the law. Prominent land-owners and lumbermen have declared themselves in favor of it.

Inasmuch as the fire hazard on lands lumbered for both hard and soft woods is too great, we would authorize the conservation commission to post all areas so lumbered—except small lumbering operations where no great fire hazard was created. Such posting would be effected by placing notices at certain legally prescribed intervals around the area in question. The notice would recite that the land was closed to hunting and fishing, on account of the fire hazard, for a period of five (or possibly six) years from the date of posting. Trespassers would be liable to criminal prosecution.

Needless to say the posting would not be effective unless enforced, and we would, therefore, ask for authority to require the land-owner to maintain a sufficient patrol to keep out trespassers during the period of years the posting was to be in effect. The patrolman would also be equipped with fire-fighting tools, and would be required to fight any fires that might be started. This would be a very intensive patrol, coordinated with our regular protective system. We would have the law provide that where the land-owner failed to maintain the patrol, the commission would have authority to put men on, and the expense thus caused should be a lien on the land.

The advantages of such a plan are obvious. The complaint is often heard from land-owners and lumbermen that fires are caused on their hands by irresponsible fishermen and hunters; and yet the owners hesitate to post their lands for fear that objection on the part of the local people may embarrass their operations or even lead to incendiarism. The proposed plan contemplates that the commission will assume the onus of the posting, but that the landowner will get much of the benefits of it. It is only fair that he would bear the expense of the special patrol in order to take care of the special fire hazard he has created by his own lumbering operations.

Another thing about this plan that is attractive to the owners is that in this way they are taking care of the special fire hazard on their own property. Most of them are willing to concede their responsibility for bearing a certain proportion of the expense for protecting cut-over land. Now, the advantage of this plan is that that expense comes when they have just received their money for the timber which they sold off that land, and they have the opportunity of setting aside a sum of money at that time in order that they may carry out their plan for the next five or six years, when it will be less burdensome than if they were asked to put on a considerable patrol or pay taxes of some kind before they had cut the timber.

The principle is generally conceded, and I believe generally accepted by lumbermen, that a man has no right to create a nuisance and to endanger his neighbors' property without at least taking all reasonable steps to abate that nuisance. I prepared a part of this paper and then in reading it over I felt that perhaps you would like some figures. I can not claim great accuracy for these figures. Let us assume an area of six acres to be limited every six years, let us say a rectangular area, or perhaps roughly a circular area, one department could take care of it seven months each year. Five years would cost thirty-one dollars ten cents, or three dollars eleven cents per acre for the entire fire season. As a matter of fact, in the average season it would be unnecessary to maintain the intensive patrol for more than a total of a month or six weeks of the entire season. At a very conservative estimate in cutting three thousand board-feet, hardwood board-feet, per acre, at a cost of two cents per thousand feet, lopping the hardwood tops, we would have an expense of six dollars per acre, and practically nothing to show for it. For about half that amount, under our proposed plan, we can give that limited area more intensive and effective protection. **(Applause.)**

Mr. PETERS. I would like to ask Mr. Howard whether the cost of the patrol would be a charge against the lumbering operation, or whether it would have to be included as a part of the cost of so-called complete protection.

Mr. HOWARD. We would have that expense borne by the men who cut over the timber-lands. Does that answer your question? That the owner of the land himself should be required by this law to install that patrol, that enforcement of the posting, after the lumbering operation is completed.

Mr. PETERS. I understand that you do not include the cost of brush-disposal, by which I mean lopping, or piling, or burning, or the like, as a part of the cost of complete protection by the state, and, I was wondering whether you would treat the patrolling cost in like manner.

Mr. HOWARD. I think that this would absolutely be a cost of protection.

Mr. PETERS. Brush-disposal is a logging cost. It is a cost which is chargeable to the logging operation.

Mr. HOWARD. Yes, it is incurred on account of the logging operation, it is not limited to brush-disposal.

Mr. HUTCHINS. I would like to ask, do you think it is necessary to patrol that seven months of the year?

Mr. HOWARD. No, I should have stated that that seven months is in the Adirondacks, the duration of our fire-season, that is the maximum figure, I believe. If we get this scheme organized and have close enough cooperation of the special patrolmen, we thus can assure ourselves, with our regular fire-protective forces, that we will be able to make arrangements whereby lumbermen who will be working near at hand might assign certain of their crew to do that patrolling, nor could we get better forest-rangers. For instance, that could have been made very intensive during this present year, which was a bad year for fires, because the fire-danger this year was concentrated in two periods, one in the spring ond one in the fall. Six weeks of patrolling would have safeguarded practically all of the cut-over land during this past season. Another year we might have a less severe fire-danger extending over two or three months, and where the operator had men working in that vicinity they could go and patrol this tract on short notice, and where we could be absolutely sure that they would be gotten in there. We would be able to relieve him of a great deal of that expense.

The CHAIRMAN. We are a little behind the schedule. We have a few more papers this morning. I think we can get through them this morning so we can start with a clean slate promptly at 2 o'clock. If that is agreeable to every one?

The next paper on the program is "Forestry on State Timber Lands," by William T. Cox, of Minnesota.

Mr. WILLIAM T. COX, State Forester, Minnesota. It seems to me that before attempting to cover the subject that has been assigned to me, that of "Forestry on State-owned Lands," it is necessary to say something in regard to the fire-protection that must necessarily precede the practice of forestry on those lands. I am not in a position to talk with regard to very many states, because I am not familiar with just what is happening at the present time in the other states; but in Minnesota we have a particularly interesting situation. In our state we have perhaps greater fire-danger than in most any of the other states, that is because the forest is a particularly inflammable kind of forest, and also because it borders on the prairie region, and is a windy section of country, and moreover we have in Minnesota the largest area of peat-land to be found in the United States. These peat-lands during the last ten or fifteen years have been drained in large part and have been transformed from the safest fire district to the most dangerous to be found anywhere. Another thing that interests us particularly is the fact that in the past our fires have sometimes developed into very serious propositions, terrible conflagrations that destroy whole communities. In some states you have little of that sort of thing, particularly in the central and some of the eastern states, where a fire may kill little timber, do a little damage, but it is not likely to destroy cities and villages, or ruin whole settlements. With us these fires may very easily develop into just that sort of thing, and have so developed in the past on several occasions. So every effort in Minnesota has been aimed at the prevention of these serious conflagrations. That was the first job.

The secondary thing was the reduction of fire-losses in general, and these were preliminary to doing anything in regard to state-owned lands and the actual practice of forestry on them.

I want to tell you samething else, and it seems to me very interesting to foresters. I believe that in the last year there has been demonstrated in Minnesota the fact that serious conflagrations are absolutely needless. They can be prevented. We have had during the last year, the last fire-season, one of the worst on record, one of the longest, one of the driest, one of the windiest, and all conditions were favorable to the worst kind of fire catastrophies occurring. It was necessary to be on the job in full force, and luckily we are in such a position that we could organize our forces better during the past year than at any other time. We had a larger appropriation to start with. Of course, it was not large enough for the department, but we had available another fund, the so-called board of relief fund, which the last session of legislature provided, and that money was supposed to be available to prevent or relieve distress in case of calamity or impending calamity; so that when the situation became really serious I went to the board of relief, consisting of the governor, auditor and state treasurer, and asked them for funds to aid our own particular forces, and pointed out the need for the money, and they gave it to us. It enabled us to more than double the force of patrolmen at a time when this was very necessary. As a result, while we had this very critical situation, over nine hundred fires occuring, not one of those fires got away during the whole season, not one of them was out of control at any time, and yet there were fires of very considerable size, and especially in this peat-land, the country that I spoke of. In one instance we had to dig a trench seventy miles long, and that was actually done by a force of about two hundred men, and that fire did not escape from the peat territory. The thing seems to me to have been thoroughly demonstrated that calamities can be prevented. We are always going to have some forest-fire loss. I believe we are likely to have more fires in the futures than we have had in the past. Settlement is taking place in the timber country, and more and more there is added danger; but the fires are going to be smaller, they are going to be extinguished more promptly.

Now, in regard to other fire-protective work, we have the railroads pretty well organized. The railroads during the past season expended almost exactly one hundred thousand dollars in Minnesota in patrolling their tracks. We laid greater stress on the patrolling there than we do on the spark-arrestor and right-of-way cleaning work, because we find that with us it works better. They are thoroughly organized. We can ask the railroads to put on so many men, equipped in such and such a manner, and they put them on. More recently we have persuaded them to put supervisory officers on to see that these men work properly. They report to our district rangers just the same as though they were state-paid men, so that it is equivalent to adding a considerable force to our forest service. Then the lumber companies have expended fifty thousand dollars on their own property, which is in addition to slash-disposal work. The townships have voted on themselves to appropriate additional taxes to provide fire-funds in different townships which aggregate one hundred and forty-two thousand dollars, and this money also is expended under the direction of our rangers. Forty-three thousand dollars was furnished by the board of relief in the emergency for patrolling for a short time. So there was a total, with the funds from the federal government under the Week's law, of four hundred and fifteen thousand dollars for fire-protection. That is equivalent to about two cents an acre, because we have a little over twenty million acres to patrol. That with us, with the present state of settlement, affords what I consider adequate protection. Roughly speaking, it might be improved, of course; but I believe that during an average year it will give us sufficient protection, all we can reasonably ask for.

In regard to the state lands, the state owns about two million acres in Minnesota, but it is in different classes, different lands; some of it is school land, some lands granted for different purposes, some of it consists of state forests, about four hundred and fifty thousand acres have been set aside for state forests. The land within the state forest is given some added care, and some degree of forestry is practiced. In the timber-cutting operations on state lands outside of the state forests, perhaps better fire-protection is afforded than on most private land, but very little forestry has been attempted or is possible under the existing law. Of the state forest lands, some are also parks. For instance, we have Itasca Park at the head of the Mississippi river. It is about thirty thousand acres in extent, and it contains one hundred million feet of pine. Some of the other state forests have very valuable stands of timber. In the case of Itasca Park we have an illustration of what can be done in state forests, even in a small one. I maintain that is one of the best illustrations in the country, and it is put under rather intensive management. Fires are absolutely prevented in that park. A fire-break has been constructed around it, it is thoroughly patrolled, it is covered with a telephone system and lookout towers, as well as a force of men watching it. Some timber-cutting is done, but it is done under forestry rules, and very carefully, so that where it has been logged over you would scarcely know it has been logged at all. The game is thorougly protected, for it is also a game refuge, and perhaps as good an illustration of a game refuge as can be found anywhere. The deer have increased wonderfully, and the beavers there run the whole place over, there being ten to fifteen hundred of them in the park. Otter have come in and are thriving there, and it is intensely interesting piece of state property. Now, we hope to see that sort of thing carried out on many other areas of state-owned land, but those things come slowly. It is a matter of education. You can not force the legislatures to go too fast in matters of that kind, as we find, but I think within a reasonable time we shall have a dozen or more areas similar to Itasca Park made out of the present state-owned land.

Now, when it comes to buying lands for state forests, we have a wonderful opportunity there, and I think they have over in Wisconsin and Michigan. So far we have bought very little land. Most of the state forests are part of what were grants to the state , but we have a great opportunity to buy cheap land at two or three dollars an acre. There are millions of acres of land suitable only for forest-growth. Figures we have collected would warrant us in believing that the poorer, rougher, lands in timber will bring just as good a revenue as is derived from the second-class agricultural lands throughout the state, and will support just as great a population. Moreover, the tourist business is starting in our part of the country, and in a short time will be very similar to what you have in the Adirondacks and in Maine. Thousands and tens of thousands of automobiles pour into the state from Iowa, Missouri and other states to the south of us. The change in the last four or five years is remarkable in this respect. Cars from all over the country show that it is going to be worth while to develop the scenic feature. Now, one of the things we are doing on all of the state-owned land is making an effort to preserve the beauty of our lakes and lake-shores. I have been able to insert a clause in the timber sale contracts so that those shores will be protected. That it seems to me is very important if we are going to develop the tourist business. On private lands hundreds and hundreds of those beautiful lakes are wrecked every year in the logging operations. As I have said on other occasions, our lakes up there are no more beautiful in themselves than the mud-lakes out on the prairie. It is simply a difference of the timber growth around their shores. Considerable planting has been done—but in that regard I want to say one word about the raising of nursery-stock. We find a good deal of trouble out there in getting nursery-stock. We have found real trouble. Our nurserymen are very well organized, and they seem to want the state to purchase seedlings to transplant from the commercial nurseries. That would be all right if we could get them at a reasonable price, but if we are going to embark on a large plan of planting it is necessary to obtain stock at a price that will warrant us doing the planting, so that we can look forward to a profit from the operation. If it is going to cost us one hundred dollars an acre to buy these little trees and plant them, we can never expect a profit from the operation, and we know that we can raise them at a cost of six or eight dollars a thousand, or say eight to ten dollars an acre for the plants, and we have been doing that. We have gotten into serious trouble in some instances with the organized nursery people, but that is one thing that I suppose every state is more or less up against, the matter of obtaining stock.

Another thing, we are leasing cottage-sites on these state lands, and derive some little revenue, and greatly popularize the state forests in that way. We are making use of the fur crop in Itasca Park. For several years we have been trapping systematically, particularly beaver, and the revenue goes to the support of the park. Last spring we trapped fifty-one beavers, catching only the males ,and sold that little bundle of fur for two thousand twenty-five dollars, which helped considerably in the support of this park and forest. Now, as regards the actual cutting operations. We have not gotten very far on the timber sales. With us for the most part our sales were made before these lands were turned over to our department, and they are still active, and the loggers are still cutting under the old agreement. These are expiring from time to time, and the new leases may be made on a different basis; but for the time being the actual practice of forestry is rather limited. We hope to see the time when Minnesota shall be like you people of the state of Pennsylvania, where me shall have millions of acres of state forests, actually designated as such, and actually handled on a forestry basis, on a permanent yield plan. We have perhaps ten or twelve million acres better situated for that purpose than any other, and even that does not express it all, because there are great areas of land which are of doubtful value for agriculture. There are also large tracts in Minnesota that have come up to second-growth pine, particularly jack pine and Norway; and while those stands of timber may be on land that can be profitably farmed later on, it would seem a crime to destroy those promising growths of timber at the present stage of their development. And so we are making an effort to have them incorporated in what might be called temporary state forests or auxiliary state forests, and there is some promise of success in this regard, because the profit or advantage to the state of doing this sort of thing is very evident.

I am afraid the time is so limited that I should not talk any more at this time. I would be glad to answer any questions. (Applause.)

Mr. PETERS. I should like to ask Mr. Cox how much this problem would be solved by fire-protection alone.

Mr. COX. That is pretty hard to say, but we have a fair reproduction of pine and spruce, hardwood too, particularly poplar and birch; but there are hundreds of thousands of acres where logging was severely done, and where fires followed rapidly, and where it will be necessary to plant, so that fire-protection is not sufficient in itself, and we shall have to do a great deal of planting.

Mr. PETERS. To what extent can natural reproduction be depended upon?

Mr. COX. Natural reproduction will take care of seventy-five per cent at least.

The CHAIRMAN. The next paper will be on "Assistance to Private Timberland Owners," by Mr. R. C. Jones.

Mr. LOVEJOY. It seems to me that the item of the bill concerning which Mr. Pinchot spoke, has rather gotten lost in the shuffle. Unless some one will relieve me of the responsibility, this afternoon, I should like very much to hear enough discussion of the status of that million-dollar appropriation and of this bill, to leave us at least fairly clear in our minds as to where the bill is and where we are.

GOVERNOR OLCOTT. I think the gentleman's suggestion is very meritorious. Oregon was not on the program. Yesterday Mr. Morrill kindly mentioned Oregon in connection with the western states. If there would be no objection, before the session closes this afternoon I would like to have a few minutes, I will be very brief. We have a very good board of forestry, a non-political organization, five members on it, being representative of different industries of the state. I notice on this afternoon's program there were some additions to it in order to fill in, so with the consent of the conference I would like a few minutes this afternoon. That would give me a better clearance with my board for spending some of their good money in Pennsylvania.

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Senate Chamber.

Harrisburg, Pa. Thursday afternoon,

December 9, 1920.

GOVERNOR OLCOTT in the chair.

The CHAIRMAN. The first paper on the program is "Plant Quarantine Protection," by J. G. Sanders, of the Pennsylvania Department of Agriculture.

Mr. J. G. SANDERS. Gentlemen, I feel almost like an interloper on your program, and I assure you I only want to occupy a comparatively brief period of time to discuss a matter which I think is very close to the hearts of most of you; at least I assume by your presence at this meeting that you are interested in plant-protection, and deeply so. The matter of plant-quarantine in America and its subsequent adoption, and the enforcement of the law, has engendered, as most of you know, considerable discussion, particularly on the part of importers of plants. Dealers and certain of these nurserymen, and pseudo-nurserymen, who have made considerable money in the past by importation of plants from foreign countries have had very little regard for the future safety of American agriculture. I want to bring to your attention the condition which exists at the present time and ask for your cooperation, which I think I already have, for the enforcement of quarantine No. 37, which was promulgated in 1912 by the federal horticultural board.

The federal horticultural board is made up of scientific men of the United States Department, who unfortunately have other duties in addition to taking care of the matters which come up before their board. The attack which is brought about at this time is the outgrowth of various and sundry attacks by dealers and nurserymen, which have been ill-timed, and rather poorly considered, and in many cases very slight attention has been given to the truth. More recently a board has been appointed representing the American rose-growers society, the American nurserymen and certain horticultural societies of several states and others interested in horticulture, either professionally or from an amateur standpoint, and these people are now getting down to a constructive opposition. I do not know how far they will go. I can not see that they will make very much advance in their attempt, but the point is this, every man I believe here should do his utmost in his own bailiwick to offset any attempt to emasculate the law or limit the federal board's action on Quarantine No. 37. This attempt is under way at the present time, and I believe that we only need to consider a few of our major diseases in order to bring to your mind the importance of limiting the miscellaneous importation of plants from foreign countries in wholesale quantities.

As state officer, I have been taking the lead somewhat in this feature for the past eight or nine years. I have made a great many friends and some enemies, but I believe that I am on the right side, in fact I know I am on the right side, and on that account I am willing to "stand by my guns."

The ravages of the chestnut-blight, which you all know has been confined to the eastern part of the country, is an example of what might be expected if we continue to permit the miscellaneous introduction by private companies and private individuals, professionalists and trade concerns, of plants from all quarters of the globe. The chestnut-blight, possibly you know, was brought in incidentally with a small shipment of trees from China, and the ravage it has caused in this region of the east is well known. The fact that there is apparently no stopping of it until our American chestnut is almost wiped out is serious food for thought. The citrus-canker is another disease brought from China and established in Florida by nurserymen. This disease was unknown to science and no one would have recognized this disease at a port of entry had it been found by an inspector. So with the white pine blister-rust.

Now, more recently we have introduced another disease that becomes particularly interesting to you, as your interest may be open toward losses of a food product. I will leave here a sample of the potato-wart disease which was found in this state only within the last three years, and promises to be a very, very serious pest, one which can not be eradicated from the ground by any crop-rotation method. In fact we have been unable to sterilize the ground with any known method within any reasonably economical cost. Even steaming the ground, the use of formaldehyde under eighty pounds steam pressure is not certain to sterilize the soil and prevent the spread of this disease.

These are a few of the well-known examples of what can be expected for future generations, if we permit unrestricted entry of plants and plant-products from foreign countries. Now, this committee has taken action only recently at the meeting of the American Entomological Society to issue a statement, and I must say has paid very little attention to the facts, and it ill becomes men of the standing of some of the men of this committee to put out a paper or a statement of this kind without trying to determine more carefully what the real facts are in connection with the enforcement of Quarantine No. 37 by the federal board. It is unfortunate that this committee did not get the facts before they published their statement "An Appeal to Every Friend of American Horticulture," in several papers and magazines. In this appeal they make the statement that there has been built a "Chinese wall around American horticulture." Now, no such condition exists at the time, I can assure you of that. Only the other evening I was in Washington discussing this whole matter, and they assured me that there was every possible attempt on the part of the federal horticultural board to permit the introduction of desirable trees, shrubs and plants of all kinds, but that they wished to safeguard these plants by certain restrictions. Now, the nurserymen are still permitted to bring into this country bulbs of certain types, but an absolute prohibition has been put on the importation of all plants of certain other types carrying soil about their roots which we can not possibly inspect at the port of entry. It is the hope at least of the federal board, provided congress gives them sufficient funds, to install a larger force of inspectors at the various ports of entry, so that less difficulty will be occasioned in the importation of plants due to the inspection at the port of entry. When I tell you that five hundred special permits, covering hundreds of thousands of plants, have been granted to importers of plants during the past twelve months, you can see that no "Chinese wall" is being built around American horticulture.

There is another side to the question. I have been laboring for some time with the nurserymen at their national conventions, on three or four different occasions, trying to explain just what this means, and fortunately most of the growers of nursery stock appreciate the conditions. .

The Japanese beetle is another pest which has come into this country and was brought in by one of the large nursery concerns, and it has become established that it came from Japan in soil on the roots of Iris. Numerous other pests and diseases have been brought in to the country in the same way. Now it happens that the nurserymen who introduced this pest are the people who have been fighting the federal board most violently. They have been using facts rather carelessly in connection with their criticisms of the work of the federal board and have been attacking it without just cause. I want to read you a brief statement from the "National Nurseryman," which gives you a little more light on the attitude of the nurserymen:

"Here are some of the losses to American farmers in the United States in one year by plant diseases which might have been prevented if known control-measures had been immediately applied: Wheat, 112,000,000 bushels; oats, 50,000,000 bushels; corn, 80,000,000 bushels; potatoes, 50,000,000 bushels; sweet potatoes, 40,000,00 bushels (two-fifths of the total crop); tomatoes, 185,000 tons; cotton, 850,000 bales; peaches, 5,000,000 bushels; apples, 16,000,000 bushels. The figures were compiled for the year 1919 by the Plant Disease Survey of the Bureau of Plant Industry, United States Department of Agriculture.

"In compiling the above the Bureau of Plant Industry has been playing the children's game of supposing.

"Why not play the game to a finish and keep on supposing what would happen if the 'might have been' really happened.

"Without disease and crop-failure present plantings would produce more than could be harvested, transported or used. Farming and gardening would soon be a lost art, no skill and little labor would be required to produce all the crops necessary.

"We might as well keep on supposing there would be no disease among animals and incidentally no disease or death among human beings if proper control measures were used. The game ends here as the imagination gives out."

I feel that you have some very important papers on your program, and although I could talk at considerable length on some of these matters, yet I believe I can readily close by asking of you the support of your different states for the work of the federal horticultural board in the enforcement of quarantine No. 37, which I believe is unassailable. The method adopted by the board may be open to criticism that you might expect from any new organization in putting the quarantine laws and regulations into force, and under the existing conditions I ask your serious support for this federal quarantine No. 37 and any regulations that may be promulgated under it.

Just a word more on this white-pine blister-rust. We have had some experience in this state, fortunately we have been able in Pennsylvania to prevent the spread of this disease, and during the past two years no appearance of it has been discovered, and that only by very aggressive action. The big question for us now is to prevent it entering into the western states, Dakota, Michigan, Minnesota, and that region, and to prevent by all means possible the introduction of this disease into the western five-leafed pine region. If it goes into that country there is no doubt but that enormous loss would occur.

If there are any questions that occur to you on this disease I should be very glad to reply to them if I can. Regarding quarantine No. 37 I do feel, however, that the federal board should have the heartiest support of you people interested in forestry, nursery-work and nursery propagation. The trees in this country, they not only are guarding your interests, but the interest of the farmers.

Mr. LOVEJOY. May I inquire, Mr. Sanders, whether there is any technical opposition; opposition from technical men, to this order?

Mr. SANDERS. On the part of technically trained men, very little indeed. We think the most serious opposition comes from the State Horticulturist of Illinois, but I really think we have enlightened him on just what this quarantine means so that he will probably change his opinion somewhat. I hate to take any more of your time, but the point is this; the strongest opposition to this quarantine comes from a great many of those who have been accustomed heretofore to get some German, English or Scotch catalogues and seeing some new varieties that they do not have in their garden, they want to introduce them; and when they find they are unable to bring in these varieties to add to their collection their ire is immediately aroused. This group have gathered up a great deal of opposition, but the technically trained men are able to see the advantage of a quarantine of this character; but, of course, the importers who have made considerable sums of money are very "peevish" over the whole situation.

Mr. COX. Mr. Chairman, I would like to offer at this time a resolution before any of the members have to catch trains.

Resolved, That the state foresters in conference do hereby express their deep appreciation of the courtesies and privileges extended to them in Harrisburg by the Pennsylvania Department of Forestry, by the individual members thereof, and in particular to Mr. Pinchot, whom we wish to thank for a repetition of his old-time hospitality.

Mr. GASKILL. I do not want to run any one else out, but I hope I may have the privilege of seconding that resolution. The foresters are pretty well accustomed to being well entertained in their going about in the country. They have had some experience of the hospitality accorded them by a good many individuals, but I think I can say without much overstating the fact that Mr. Pinchot and his organization have laid themselves out here in such fashion that we can joyfully and whole-heartedly say you have done yourselves, and us proud and we are very grateful to you.

The resolution was unanimously adopted.

The CHAIRMAN. The next paper on the program is "Keeping Idle Forest Lands Busy," by Prof. P. S. Lovejoy, of the University of Michigan.

Prof. P. S. LOVEJOY. Mr. Chairman, I have taken the liberty of changing the title a little, so as to make it read, "Making the idle cut-over lands get busy,"

In a theoretical way, the problem of getting the cutovers to work is absurdly simple. First, you designate those areas which will shortly be needed for uses others than timber-production, then you stop the fires, thereby saving whatever there may be left of the original forest and permitting volunteer growth. Later, as convenient, you, fill in the holes by planting, proceed to your thinnings, and when things are nicely settled, put in your spare time drawing curves revising the working-plan, and complaining over the professional and personal shortcomings of the office over yours.

All very simple, as far as the technical end goes; get your land, stop the fires, take what natural growth you can get and supplement it artificially as fast as practicable. But it is not as simple as all that—is not simple at all, as things look from 1920.

As to matters of artificial reproduction, there is no longer any possible question.

Having gotten pretty much over our German-made notions about Scotch pine and Norway spruce and European larch, and having been cured of our short-cut to glory via catalpa and locust, we are about ready to get down to business and to thank our gods for jack pine and popple, loblolly and red gum, white fir and birch. We have broadcasted and seed-spotted and grub-hoed and fussed with 3—2 and 1—0 stock, have made quite a lot of 0—0, and now know about all we really need to know in order to pick up and go at any speed. Suitable planting stock? By the tens of millions or billions—a few months after anybody orders it. Planting methods? Spud or mattock or plow or spade—and so as to insure a decent survival and adequate catch with all the certainty with which a farmer sows clover—more certainty than that. Subsequent growth? Not a question but that it will be satisfactory; the basal area computations can wait.

As to the quantity, quality and usefulness of the volunteer growth which will follow automatically upon the suppression of the fires, we are, I think, rather shy, both in facts and in faith. It is my very strong impression that we have been overlooking a very big bet here. Research upon elastic limits and the effect of polarized molasses upon the xylotomous tissue of Bunkobus tittywampus we have not lacked. As to just what happens when fires are kept out of cut-over land I can find little worthy information and still less technical interest. We are even told to hush-hush on that subject, for fear legislatures will get the notion that nursery-work is superfluous, and that clean-cut and plant is the high European hunch. There will be exceptions, of course, but my own feeling is that the stopping of the fires will in the majority of cases insure a forest which will prove very decently satisfactory and which will give more usable forest per dollar of fire-money than will a hundred dollars of planting-money. It is certain, of course, that better forests will be made to follow the early volunteers and that nursery-work and planting can contribute to this very largely.

If then, it may be assumed as established that we have developed an easily workable technique for big-scale forest-planting, and if it is admitted that the volunteer forests will be much better than merely worth saving from fire, we are brought back to the consideration of stopping fires. How about that? Have we satisfied ourselves that we can stop fires? What do we mean by that? Not that we plan to prevent fires from starting, for we know they will start. Not that we do not expect some big and costly fires, even after we get things fixed up to suit us, for we shall expect some bad fires. Perhaps we mean that on the average fire-losses are to be reduced to a negligible minimum—to such a small fraction of loss that it can be disregarded. How much of a loss is that, in per cent of acres per year and per rotation?

What is adequate forest-fire protection? If but one per cent of the area protected is burned over in an average year, will that be considered pretty good work? That would be equivalent to burning over one hundred per cent of the area every one hundred years. To burn over one acre in every thousand would amount to burning over ten per cent of the area in one hundred years. We have been taught forests may not be expected to pay out more than three or five per cent, net, per year. If the forest suffers a ten per cent loss from fire, each rotation, where then would the net returns be? Can anyone show a single solid township of cut-over country subject to normal fire-hazards, where fire losses have actually been kept down to twenty-three acres a year for ten years, or five years? What about this "stopping-fire" talk which we all get off so glibly?

In Michigan, if anywhere, there should be some experience and judgment concerning fire in the cut-over country. But an official report from the United States forest service to the responsible state officers last year said that a cent an acre should give "adequate" protection. At the same time one professor of forestry was saying that five cents would be required, and another professor was saying that the job could hardly be done for less than ten. Meanwhile a forester who had had years of experience in operating a big private fire-protection association was saying that, for three cents, he could reduce fire-losses to that degree justified by the value of the property protected.

The national forest in the jack-pine plains of Michigan was then charging up five cents an acre for fire-protection and rather crediting itself with intensive work. But one day the wind blew in the usual "unprecedented" manner while the country was in the usual "abnormally desicated condition," and the fire went to Silver Creek or thereabouts in the customary manner, burning over a per cent of the area protected which would be too sad to quote. During all this time the state forester, who alone of the entire outfit could show a chunk of cut-over sections where fire had actually been kept out for twenty years—new fires running up to the fire-lines from outside, year after year, and being stopped at those lines—he was making no statements whatever as to the practicability of stopping fires or as to the cost of stopping fires. But, having already one big tractor to pull stumps and clear fire-lines, he proceeded to get another tractor to clear fire-lines and to keep those lines clean.

I am well aware that the American forester can exhibit a greater accomplishment per dollar of fire-money expended than anybody in the world. I am willing to assume that the machinery for fire-prevention and control has nearly all been invented and tested out. I have seen fire fought in a good many states and under many conditions. I have no doubt but that it can be done and I have a full conviction that it must be done, but, with the exception of a little string of sections on the Higgins Lake state forest of Michigan, I have never seen a place where fire has been actually, deliberately and artificially kept out of the cut-over country for so long as ten years. Those sections have fire-lines around every forty-acre square, those fire-lines are freshend twice a year, a fire-tower overlooks the area in great detail, there are many roads, a real fire-fighter is custodian and he has a crew of men with automobiles constantly available.

Considering everything, is it appropriate that we should be so smug and so glib about stopping fires on the cut-over lands? Have we told the full truth about the costs and difficulties of that thing? Have we made serious or adequate attempt to determine the essential facts and practicabilities? Do we know as much about the effect of fire on soil and forests as we do about the effect of seed extracting house heat or the viability of tree-seed collected from altitudes A, B and C, and from dominant, co-dominant and sub-dominant specimens of juvenile, mature and decadent condition?

We are inclined to bemoan the difficulty of developing an intelligent cooperation in fire-work from settlers, hunters and fishermen, not to mention railroad officials and business men. We allege that stopping the fires would vastly improve the stocking of game and fish, would lead to a great expansion in the recreational values of the cut-overs, would conserve the scant organic content of forest-soils, would insure forest-products for the wood-using industries, and so forth. But where is the forester who is in a position to substantiate these statements in an orderly and convincing way? A university forestry department undertakes to show a relation between forests and wild life and dredges around in the bottom of a lake for proof, instead of taking a census of the animal life in a typically unburned and in a typically cut and burned area.

A high official of the United States bureau of soils informs an influential citizen that the damage done to soils by fire is commonly exaggerated, and that the organic deposit of the forests typical of the north lake states is deleterious to both soil and forests, and its removal—as by fire—will benefit both soil and forests—and the United States forest service is not in a position to demonstrate the contrary. A professor conducts an experiment showing certain agricultural advantages to be possible by burning over peat-lands and the state forester spends a summer fighting peat-fires.

In another state an irate citizen writes to his paper claiming that the stopping of fires in the young second-growth is vastly more important than planting wind-breaks and the like, and the presumably responsible officers hunt around to find somebody to bawl out the offending citizen for his dangerous contentions. .

My feeling is that foresters have done little more than flutter around the subject of cut-over country fires. This may once have been expedient, but is it expedient from now on? The chief of the forest service is about to ask congress for a million dollars as a bait to catch fire activities in a score of states. The state forester of Pennsylvania proposes to ask his legislature for a million dollars for his state alone. There is no forester who will doubt but that it will take that much or more to stop the fires in Pennsylvania, and equal sums in a dozen other states. There is no forester worthy of the name who doubts that such funds so expended would be the best sort of investments. But, save for that one man, where is the forester who has been telling the full truth about fire-control and its cost in the cut-overs and acting according to his convictions?

It is a tremendous undertaking, gentlemen, but one which will not be advanced until we quit our pussyfooting. If in its accomplishment tender and timid foresters must be replaced by bolder and hardier men, foresters or otherwise, then the more reason for starting soon. The problem of getting the cut-overs to work starts with better fire-protection, is conditioned upon more fire-protection, and lingers as long as fire-protection is wanting.

Whatever the local technique best adapted to the job, it will involve great sums of money and a very large personnel of fire-trained men. We shall continue to learn that part of our business by fighting fires. We shall get a chance to fight fires and thereby learn this business only as we are able to convince the public that stopping fires is at once practicable and worth the cost. It is my thought that we have not yet succeeded in either; that we have not yet properly demonstrated that stopping the fires is really practicable or that it is worth the costs. If I am wrong in this, someone will certainly contradict me directly and will arise with convincing argument and object-lessons, pointing out instances where cut over country fires have long been kept under control, and pointing out the exact relations between the cost of the fire-work and the increase in values arising out of the protection.

I know, of course, that these things are subject to demonstration; my point is that the full demonstration is now lacking, and being lacking, it is reasonable to expect a considerable measure of skepticism and hesitation on the part of the public, legislatures and congress. That lack requires remedy in the very near future.

So much for artificial restocking, for volunteer growth and for fire. There remains the matter of getting the land. This, of course, is the big item—the item most generally lacking and, perhaps, the item in which we have bungled most greviously. We can not plant, can not grow or tend volunteer forests or keep fires out of the cut-overs until and unless we have some manner of jurisdiction over the lands—the cutover and burned-over lands, the lands now lying idle, loafing or devastated by ax and fire—and by the hundreds of millions of acres, and in twenty states.

As in the case of fire, it is my feeling that in their procedure foresters have very often been seriously at fault in all this—that we have failed to apprehend the nature of the obstructions which have confronted us—that we have not used all the tools ready to our hand or have bungled and fumbled in their using.

Take the case of Winconsin as the most perfect example of this. After years of leadership and uniformly favorable legislation which appropriated funds and gave authority for the direct acquisition and consolidation by the state of cut-over land, for state forests, and generous authority concerning fire and planting, there developed a sudden and violent opposition to the whole scheme. Entire county boards came down to the capital, breathing fire, a case is forced to the supreme court of the state and the court invalidates the whole forest program, holding it to be unconstitutional. Now, how could such a thing happen?

The nubbin of the controversy hinged in this; the state forester's plans disregarded the point of view of the citizens living within the areas designated for consolidation into state forests. The state forester, following the early precedents of the national program, and with too single an eye to easy administration, planned to acquire about a million acres lying in a nicely rectangular solid chunk. Within this area were streaks and patches of loams and clays more or less well suited for agriculture and already supporting more or less in the way of farming settlements.

In Wisconsin, after years of labor and concentration, they had developed an unusually clear and workable policy of agricultural development. The state forester did not understand its potency, allowed himself to appear as opposed to it—and was smashed, along with his forest-program. It was another case of the "June eleventh" troubles of the national forests, only bigger and more acute.

While the state forester was traveling the southern counties of the state with a set of lectures and lantern-slides showing endless devastation caused by fires, the state director of immigration was also traveling with a set of slides showing the are considered or undertaken, foresters will need to insure themselves of representation and of adequate consideration for their point of view. Soil-surveyors are few in number and inclined to regard very highly the sufficiency of their private technique, and the agronomic data which they characteristically append to their field-records and reports has to do almost exclusively with affairs of orthodox agriculture. With them, as with their brothers of the agricultural colleges and experiment stations, forests as crops, appear as mere academic conceptions, not reasonable probabilities save for the utterly waste and hopeless lands. They are usually willing that the forester should some time scavenge after them when the soy-bean and the frost-proof peanut fails, but not before. We have been too modest or too timid. But lumber is now quoted by the board-foot instead of the thousand feet, and pulp is quoted by the pound rather than the ton.

If the solution of the cut-over-land problems has yet to be found, we, as foresters, are very largely to blame. We have not always played our hand with courage or with skill. It is time to shake things up and get going to the tune of "Every acre working all the time."

Mr. PINCHOT. I have been very much impressed by this paper of Professor Lovejoy's, particularly that part which relates to fire as correlated with the discussion we had on fire this morning. Would it be in order at this time to move that the president of the Society of State Foresters be requested to appoint a committee of three to report to the next meeting of the association on the question of standards of fire-protection? My intention is to make that as wide a subject as it is possible to cover.

Mr. GASKILL. I think it altogether admirable that the national organization or association should follow the precepts laid down. I second the resolution.

The resolution was unanimously agreed to.

Mr. MORRILL. Mr. Chairman, I would like to ask if there have been arrangements made whereby the papers which have been read may be multigraphed or mimeographed and the members to receive copies; if such arrangements have been made, or can they be made?

Mr. PINCHOT. May I answer that question, so far as I can? It is my hope that it will be possible for the Pennsylvania Department of Forestry to print the proceedings of this conference and supply copies to all of the members.

The CHAIRMAN. That completes, I believe, the regular scheduled program.

Mr. PINCHOT will you kindly take the chair?

Mr. PINCHOT in the chair.

GOVERNOR OLCOTT. Mr Chairman and gentlemen, I spoke briefly yesterday about the airplane and fire-service that the Government has given the states of California and Oregon, and in that connection I want to briefly state that I have before me a little magazine published in New York, called "The Old Colony Club." They asked us for a typically Oregon story a couple of months ago, in response to which this was prepared. It deals largely with the airplane fire-service in Oregon. I will read it to you.

"While the smoke of industry year after year hangs in denser and still denser clouds over the cities of Oregon, and while her agricultural resources have grown to proportions so vast as to be unbelievable, even to those who first saw and pioneered the way for those industries, we claim an intense pride in two of our greatest assets, our timber and our scenery.

"These assets are inseparably intertwined. Our lakes, our waterfalls, our rivers, our majestic mountains and our tortuous glens of perpetual green would become wastes, inhospitable in their barren bleakness, but for the stands of fir, of pine, of spruce and of cedar and hemlock, which crown them with the glory of God.

"To give to the world her fair share of our timber, cut into the sizes and lengths which will take it into the channels of commerce and trade, to build our ships, to house our peoples and to be converted by the hand of man into the million utilitarian uses to which lumber may be put, is one great share of our problem. For Oregon has within her vast boundaries one-fifth of the standing merchantable timber left in the United States today. More and more the world is looking to the mountainsides of Oregon for the lumber to ship to the nations bordering on the seven seas, and it is the duty of Oregon to use this birthright in the manner that will bring the greatest good to this nation and to the peoples of the world.

"The other magnificent share of the problem confronting us is to retain in the fullest splendor possible the God-given wonders of Nature, our scenic beauties which challenge the Alps and look down with scorn upon many of the boasted wonders of the old world.

"But too few years ago the people of our state began to awaken to a realizing sense of her wonderful endowments. But we are awake now, and from every county, city and hamlet comes the cry to save what we have ere it passes away from us forever.

"The forests have two deadly enemies. One is fire and the other the destroying hand of man. By means of the latest of man's own devices, a device that gives us the wings, and the speed, and the eye of the bird, man has turned to his own use the airplane to combat the ancient enemy of the forest, the ravaging fire. To protect the forest against its other enemy man is beginning to look into his own heart and be afraid of the ravages which he himself has wrought. Between the two we have hope to save for trade and commerce the lumber to which it is entitled, and sufficient of the forests and the witching greenery with which they are braided to preserve our scenic marvels, and to leave here forever in the heart of the Pacific Northwest a paradise for tourists and sportsmen from every land and clime.

"To revert to the airplane. The aerial forest-patrol is an unqualified success. Despite obstacles difficult to overcome, such obstacles as are always confronting untried ventures, the aerial forest-patrol has proved itself a success and a boon to those who have watched millions of dollars' worth of timber evaporate into smoke-wreaths.

"The patrol was inaugurated in 1919 when eight planes were sent into Oregon from the army service in California. Here I wish to express my appreciation to Col. H. H. Arnold, commander of the air service for the western department of the army, and Lieutenant-Colonel Watson, one of his ablest aides, who were directly responsible for sending these planes into the state, after I had made an air trip from Portland to Sacramento and San Francisco with Lieutenant-Colonel Watson, to discuss with Colonel Arnold the feasibility and possibility of establishing an aerial-patrol in Oregon. The planes that came were manned by as fine a body of young aviators as could be found in the service, and millions of feet of timber are today standing unscathed in Oregon as a monument to the skilful alertness of these pilots who braved every danger known to aerial science to pioneer the way for what will eventually be the most efficient form of patrol system known to man.

"Despite the wonderful success they had, it was only after a bitter and prolonged struggle that we could secure for 1920 a complement of planes suitable for patrol-work. Again Colonel Arnold, undyingly devoted to the belief in his cause, came to the front with the planes that have meant another wonderful season for the forests of the state. While final reports and figures are not yet available for the season's work, the ten planes that were sent here covered the forests in many sections like blankets. In far-off places and in remote canyons and recesses of the mountains they spied the tiny puffs of smoke that meant quick ruin and destruction to vast areas of timber unless its fires were curbed quickly and effectually. Many of these incipient fires were beyond the eyes and the districts of the regular patrolmen, but the planes brought quick response. Enormous areas of forest may be patrolled in a single day by a solitary aviator; areas which would require the services of many men over widely distributed sections without the aid of the planes.

These airships operated at the expense of the government forest service, although the state stood ready to share in the burden if demanded.

"The planes are saving the forests to industry, and we are looking to the hearts of our people to save for us and our children and our children's children the magnificent beauties which we have always considered as our right.

"Like the prodigal who inherits a fortune and spends it giddily and gaily in the folly of his belief that it will last forever, we have been squandering, without heed or thought of the future, the greatest inheritance that can be given to mankind. We have been squandering the birthright given us by the Creator himself, but through word which has come to me from people all over the state, I know that we are seeing the folly of our prodigal ways and will call a halt before our bank account with Nature is closed.

"There is something selfish behind this with all of us. It is not altogether a truism, it is not altogether sentiment. We have millions of dollars worth of scenery within our borders to sell to the beauty-loving people from every state and nation. We are spending millions of dollars on a hand-surfaced highway system, which, when finished, we hope will surpass that of any state in the Union. These hard-surfaced highways will penetrate the heart of our scenic centers and take the motorist leisurely on his way through wonders which no painter with brush or words can portray.

"In our efforts to curb the destruction of our forest beauties we are finding the cooperation of the timberman as well as of the private citizen. We hope to enact laws, or in some manner meet the emergency, so that those who, hold private rights in property will not lose thereby. The move is not one of socialism to give to the state the property which, by the right of our constitution and laws, belongs to the citizens of our commonwealth and nation. It is a move to preserve, to cherish and to keep close to our hearts that beauty in the environs of which God Almighty wished his people to live.

"We regret that in the years gone by the public was not alive to the destruction and waste which were being wrought around them. Nature has been so lavish with her favors here that they seemed an unending blessing.

"But if the law and public opinion and the hearts of our people can accomplish it, we will preserve for all time and all generations enough of the beauty remaining so that Oregon will continue what Nature intended her to be—a Mecca for the tourist and an Eden for those so fortunate as to reside within her state lines."

After concluding the reading of the magazine article Governor Olcott read the following paper dealing with forestry questions, particularly as to the forestry policy in Oregon:

"Being the most heavily forested state in the Union, Oregon must each year take greater interest in matters affecting forest-industry. The prosperity of its citizens is more than elsewhere closely linked with forest-resources and forest-industry. Our prominence among forested states also required recognition that the rest of the country is interested in the management of our forest-resources.

"Oregon contains about one-fifth of the nation's timber-supply. It is now third and will soon be first among lumber-producing states. The annual lumber pay-roll is already about fifty million dollars. Climate and species are favorable to rapid forest-growth. We have to consider not only the use and protection of a great existing resource, but best future use of an increasing area of land from which timber is being removed.

"These considerations have not been neglected. More money is spent for forest-protection in Oregon than in any other state. Last year the sum expended outside national forests was approximately three hundred sixty-two thousand dollars, which included a far greater amount for fighting fires than should be spent for this purpose. All merchantable timber and most re-stocking lands are covered by cooperative patrols supported mainly by timber-owners but also by state and federal government. Oregon pioneered the way in compulsory protective legislation, compelling by law all owners to protect land having forest-fire hazard, whether commercially timbered or not. It has equally rigid laws compelling slash-disposal, abatement of fire-nuisance and control of fire. Unfortunately at an early date we disposed of most of our timbered school-land. We now recognize this as a mistake and are seeking to re-establish state forests. We are keenly alive to the importance of forest-growing as well as forest-use, but with over half our land area untaxable being in national forests, Indian reservations and unappropriated public domain the raising of revenue for state needs is more difficult than in many eastern states.

"Luckily natural reproduction is usually swift and certain with us if protection is given. Many of the technical difficulties existing elsewhere do not trouble us greatly, and we are making good headway toward giving the protection.

"It is figured, however, that to adequately protect the twelve million acres outside national forests will require an annual expenditure of some three hundred forty thousand dollars, and that since much of this area is not in merchantable timber, government and state must bear a fair share of the expense. By doing this we propose too that the state and government have a decided voice in the program to be carried out, and we propose too that the bulk of this fund be expended in a manner to prevent need for fighting large fires.

"Oregon early adopted the belief that in all forest matters the leading interests, private and public, must be harmonized and jointly represented in the framing and execution of policies. The state needs their interest, technical competence and local familiarity. Our success in this has produced firm conviction that it is the correct principle to underlie all state, federal and private relations in forest matters. It is no longer theory that in no other way can rights and responsibilities be successfully adjusted and general public support assured. We have tried out the principle while others have been questioning whether or not it would work.

"Ten years ago a state board of forestry was created with the governor as chairman and the head of the state forest school as a statutory member. Believing in the representative principle, our state provides that the other five members be nominated by the lumber interests, timber interests, agricultural and grazing interests and federal forest service. This board has for ten years worked in perfect harmony. Each interest has been fair and willing to yield to the majority, while at the same time contributing services which the state could not have secured for a money consideration. The representatives of forest industry and consumers have been no less public-spirited than government and state officials, and the result is the progressive legislation I have briefly mentioned and a spirit which I am convinced will meet new problems equally well as they develop.

"It was not until the passage of our present forest code in 1911 that forest matters in Oregon were given much consideration, speaking in terms of actual accomplishment. Not until this time were funds made available to employ a state forester and fire-wardens. Since 1911 progress has been rapid even though appropriations are far from adequate. However, the timber-owners have cooperated with the state and made possible a protection system which we feel is not surpassed in excellence by any state in the Union.

"Our state board recently adopted a forest-policy with a view to having an even more definite program to follow and also to outline a course for public education in forest matters. Time will probably not permit presenting this policy for your consideration. It advocates state forests, assistance to farmers and timber land owners in management of their properties, tax reform, land classification, protection of all potential forest-land and a campaign of education looking to better public understanding of our forest problems.

"In conclusion I wish to state that we advocate the same constructive cooperation in national forest-policy which has proven so successful in state affairs. Just as we have been able to assist, correlate and promote the efforts of other agencies without denying their independence or alienating their support, so we believe the government should have a program equally designed to bring out the best state effort without denying local competence, police power, rights or responsibilities. I believe the Oregon system has proven that such a course will succeed.

"For this reason and because in our case at least the fire-problem underlies all other possible steps, we favor a substantial federal appropriation for cooperation with the various states in forest-protection and replacement and will urge on our congressional delegation support of such a measure."

I will close my remarks by reading to you a forest-policy for Oregon, advocated by the Oregon state board of forestry.

"Realizing the vital importance of the forests and of forest-products to the economic welfare of the people of the United States and especially to the people of the state of Oregon, the state board of forestry hereby approves the following fundamental principles as indicative of its proper field of activity in assisting in solving national and state forest problems, to the end that forest industries may be perpetuated and extended and that the people of the United States and of this state may for all time have timber-supplies adequate for their needs.

"Federal Activities.

"1. The state board of forestry recognizes the desirability of maintaining the present national forests under federal control and believes in the blocking out with certain limitations of existing federal forest-areas, by purchase or otherwise, of absolute forest-land in the interest of more efficient and economical management of existing forests.

"2. The state board of forestry believes that congress should make adequate appropriations to insure reasonably rapid forest replacement on all denuded national forest-land.

"3. It is urged that congress make appropriations sufficient in amount adequately to protect all national forest-areas from fire and insect-depredations.

"4. The federal government should provide for a comprehensive inventory of the forest-resources and absolute forest-lands, including:

"A. The total supply of merchantable timber.

"B. The total acreage of immature timber with the approximate time of its maturity and the estimated yield at maturity.

"C. The total amount of forest-land now unproductive.

"5. The state board urges the maintenance and extension of airplane-patrol by the war department, in cooperation with the United States forest service.

"6. It is believed that the federal government should not only continue but extend its experimental work looking to better utilization and handling of forest products. Field experiment-stations should also be maintained throughout the west as a means for studying fire, grazing, reforestation and other problems.

"7. The United States weather bureau has, for the past five years, rendered valuable service in forest-protection by forecasting protracted hot spells and dangerous fire-winds. This service has not been brought to the highest state of perfection due to inadequacy of funds for conduct of studies aimed at perfection of the work. It is urged that adequate federal appropriation be made for study of methods in forecasting fire-weather.

"Federal and State Cooperation.

"1. Since forests are a national asset and contribute to the welfare of all the people, the state board of forestry urges that liberal federal appropriations be made adequate in amount to prevent and control forest-fires outside the national forests, such appropriations to be met by equal expenditures within the state.

"2. Funds should be allotted jointly by the federal government and the state for the classification of forest-land now outside national forests in order that no land better suited to agriculture than to forestry may be devoted to forest-purposes.

"3. To facilitate management, there should be in operation a policy of land-exchange, on the basis of equal values, between the federal forest service and the state of Oregon.

"4. The federal government and the state should provide a plan of cooperation through which forest nursery-stock may be supplied to farmers, municipalities and other land-owners at cost of production.

"5. In the interest of economy and efficiency, a cooperative agreement should be entered into through which the state would have the privilege of purchasing supplies and equipment used in the various branches of forestry work from the federal forestry service.

"State Activities.

"1. Such legislation should be enacted as will make possible, through cooperation with the federal government and by direct state action, that degree of fire-prevention and control which will make forest-properties an insurable risk. The state board of forestry regards fire-prevention and control of fundamental importance in any forestry program for this state. Fire-protection should be extended to all potential forest-land as well as those lands now carrying mature or immature timber-crops.

"2. The state of Oregon should enter on a program of acquisition, by purchase, gift, bequest or acceptance in trust, of logged-off or otherwise denuded absolute forest-land.

"3. The state board of forestry commits itself to an aggressive campaign of education, by publications, lectures, demonstrations and otherwise, to the end that the people of the state may be fully informed concerning the value and extent of its forest-resources, the damage done to immature and mature forests by fire, together with the means which should be employed to bring about the full and continued utilization of forest-lands within the state, and to insure the full protection and wise use of the state's existing timber-supplies.

"4. Systematic and continued investigations of insect-depredations should be provided for, in order that feasible means may be discovered for minimizing timber-losses through this agency.

"5. There should be created a commission authorized to investigate and report upon the whole question of the taxation of forest-lands devoted to the reproduction of forest-crops, and of these crops during the period between establishment and maturity.

"6. There should be a definite program of assistance to woodlot owners and to those who desire to establish forest-plantations for farm use, for commercial timber-productions, or for beautifying the public highways.

"7. The state should lend every reasonable encouragement to the establishment of municipal forests for the protection of watersheds valuable to towns and cities in maintaining their water-supply.

"8. Since Oregon heads all other states in the extent of its timber-resources and since the state has within its borders absolute forest-land sufficient in amount to enable it to maintain this position of supremacy, the state board of forestry believes it will be doing a real service to the state in striving to maintain this position of leadership both by advocating the policies indicated above as well as in advocating other lines of activity when such shall appear desirable." (Applause.)

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Mr. PINCHOT. Before I relinquish the chair to the governor I would ask if there is any discussion of this paper, and if not, now that I have him at this disadvantage, I wish to say that the chair would be very glad to entertain a motion on the part of any member of this conference expressing the opinion of the conference as to the gracious and able way in which the governor has presided over our deliberations—

Mr. PETERS. Mr. Chairman, I make that motion.

Mr. MORRILL. Mr. Chairman, I second the motion.

Mr. PINCHOT. And as to his very notable contribution to the success of this meeting. Under no other circumstances could it have been as satisfactory as it has been with you, Governor, in the chair, and I know that all agree with me.

The motion was unanimously agreed to.

Mr. COX. If it is in order at this time, I would like to announce the names of the committee on standardization of forest-protection: Messrs. Peters, of the national department of forestry; Elliott, of Oregon; and Mr. Pinchot, of Pennsylvania.

Mr. HOWARD. It may not be necessary, but it occurs to me that a suggestion might be in order at this time that the committee would appreciate the assistance and the cooperation of the president of the State Foresters' Association, Mr. Cox. It appears that the middle west, where the problem is of great importance to be considered by this committee, is not represented, and I am sure after speaking with Mr. Pinchot, a member of the committee, I am sure the committee would welcome and hope that they may have Mr. Cox's assistance and collaboration in their work.

Mr. COX. I shall be very glad to serve the committee in any way I can.

Mr. GASKILL. Can not we all volunteer to help out that committee in any way that is practicable? I do not think anybody wants to hold back.

Mr. PINCHOT. I am sure, as one of the members of the committee, that we would welcome such cooperation. I am sure we all would.

The CHAIRMAN. What is the next business to come before the meeting?

Mr. LOVEJOY. I am not at all clear in my mind as to how the principle item of business before this conference, now stacks up. I am not clear and I should like to find out something as to the detail of the status of the bill which has been introduced, or is about to be introduced; which was or was not, or will or will not give us as much as one million dollars or more of Federal fire money. As I understand the situation, a bill has been framed by the chief of the forest service, and consent or approval for the bill has been obtained from the secretary of agriculture. Presumably it will become a part of the appropriation bill for the department of agriculture. If I am properly informed, or if I understand the remarks made by Mr.

Pinchot yesterday, there seems to be very grave doubt that this bill in its present form, will receive any consideration whatever. I also understood that the defects in the bill might be rendered. Just what that remedy might be I do not understand, and I should like to inquire of Mr. Peters, as the representative of the forest service, what his understanding of the status of that bill now is.

Mr. PETERS. Mr. Chairman, I am suprised that there should be the mystery about it that Professor Lovejoy would have you think. The facts of the case are those, which I thought were pretty generally known, that when the forest service estimates for the next fiscal year were sent to the secretary's office, in the customary manner, they carried a million-dollar item for cooperation with the states in keeping forest lands productive. The one-hundred-and-twenty-five thousand dollar Week's law item, the current appropriation for cooperative fire protection, was not included. We, along with all other bureaus, were subsequently informed that any increase in current appropriations would have to be submitted as general legislation, or supplemental legislation, outside of the regular agricultural appropriation bill. Consequently the item of one hundred and twenty-five thousand dollars was substituted for the million-dollar item, and that is the way the bill now stands. To carry out the secretary's request, the million-dollar item has been forwarded to the Secretary of the Treasury as a supplemental appropriation, which, as I understand it, will come before the House Committee along with the regular appropriation bill, and if approved by the committee will be substituted for the one hundred-and-twenty-five-thousand dollar item now in the bill. Is that perfectly clear?

Mr. HARRINGTON. In other words, if the bill fails of passage all the money of the Week's law is lost at the same time. Do I understand it that way?

Mr. PETERS. No; if the committee does not approve the substitution of the million-dollar item for the one-hundred-and-twenty-five-thousand-dollar item, the one-hundred-and-twenty-five-thousand-dollar item stands.

Mr. HASTINGS. May I ask Mr. Peters a question? In case the million-dollar item is approved by the committee and if rejected in the house or senate, do we then lose the one-hundred-and-twenty-five-thousand-dollar item?

Mr. PETERS. If it were rejected by the house the bill would then go to the senate without the million-dollar item, and, of course, without the one-hundred-and-twenty-five-thousand-dollar item. Now, what the senate does is another matter.

Mr. LOVEJOY. I should like to ask a question of Mr. Peters: What his understanding is of the point made by Mr. Pinchot yesterday that the million-dollar item, as written, very plainly carries new language which would be subjected to a point of order by any member, and whether if that is the case it is not very likely that such point of order will be made, and if so as to the chances of that one million dollars? If any member can stand up, as I understand it, and say, "I object, this is new language," and, then the bill automatically goes out, is not the chance of getting that million dollars tremendously jeopardized? It certainly is so jeopardized, it seems to me.

Mr. PETERS. There is some question as to whether that is new language, and that point has not yet been cleared up, so far as I know.

Mr. LOVEJOY. Surely this bill—

Mr. PETERS. Oh, yes; it is cooperative fire-protection.

Mr LOVEJOY. I should say it was, Mr. Peters. I presume every one is acquainted with the wording of the bill, but I should say that as a matter of fact, the fire-protection item is a minor matter as the language now stands, and that this language was subjecting the million-dollar item to tremendous jeopardy.

Mr. PETERS. I would hardly call it a minor matter, as we would spend most of the million dollars on fire protection.

Mr. LOVEJOY. I should say that the item in this connection was minor.

Mr. PETERS. I do not think that the committee would so consider it.

Mr. LOVEJOY. In order to be perfectly clear may I ask this question: As to whether, in your opinion, it is likely that the bill in its present form would pass the house or the senate without objection being made to what I assume to be new language?

Mr. PETERS. It may stand a very good chance of passing.

Mr. BESLEY. Isn't it so that if a point of order is raised about its being new language the speaker of the house or the president of the senate rules whether the point of order is well taken?

Mr. PINCHOT. Yes, sir.

Mr. BESLEY. And if he rules it is well taken, it will be dropped. If he rules it is not well taken, or in either case a vote will be taken of the body if they disagree. That is my opinion of the subject.

Mr. PINCHOT. My understanding is, if I may say this much from the chair—in a moment I am going to ask Governor Olcott if he will kindly re-assume the chair—in explanation of what at least has been the practice in so far as a point of order is concerned, that under the rules, unless they have been changed, always a point of order must be sustained if the language is new, and the language is new, at least is was so in my time, if there is a word in the appropriation bill which was not there before; in other words, it does not depend in any degree upon the form of the expression or the purpose, but upon the actual language itself. At least that was so ten years ago when I was very familiar with this sort of thing.

Governor Olcott, may I ask you to assume the chair?

GOVERNOR OLCOTT. Mr. Harrington will you kindly occupy the chair?

Mr. PINCHOT. May I explain briefly the matter as I understand it? It being true, as I understand it, that any language which is different from the language which is already contained in the bill is subject to a point of order (and I speak with entire confidence in this matter as to how the rules used to be, because we got a good many of these things through in the old days) my belief is very strong that no matter whether or not all of us get behind this particular item, it will necessarily go out. As I understand from my special investigation of the matter in Washington, men of great influence in both chambers are opposed to it.

I want, if I may, to state the difference of opinion as to the fundamental policies involved, and I am so very, very much interested in securing the appropriation that I venture to make it, and you can then look at it as you choose.

There are four or five things that, as a rule, you have to have to get through an item of this kind that is subject to a point of order. It has to be brief; it has to be unmistakable in its language; it has to be unobjectionable; it has to be for an obviously necessary purpose; and it has got to be substantially without support which would lead to criticism. I say this because we got through in the old days of the forest service a great many such items in different appropriation bills.

Now, it just happens that this very language is subject to all these objections. It is long instead of short, it is difficult to understand instead of clear, it involves a big question of policy and therefore it is sure to meet with objection; and in addition to that, and entirely apart from the merits of what I am about to say, it embodies language prepared by great lumber interests, and therefore would naturally meet with objections. To my mind it is absolutely clear that any item to which these various objections are to be made has not a show in the world, and it has not a show in the world in addition because of the specific objection which will be made.

I am keen as a briar to get this money, and I think that there is a chance of getting it if we go at it in the right way. I think there is no chance of getting it if we go at it in the wrong way. The only way in which we can get it is by putting the language in such shape that it will awaken as little objection as possible. Of course, it is perfectly clear, at least it seems to be perfectly clear to all of you, that no great decision as to policy can possibly be reached in an appropriation bill. If I wanted to try to put a national point of view over I would know with absolute certainty that it was absurd to try to do it in an item of an appropriation bill. It cannot be done. Things in congress are not done that way. Big things can only be settled after a great deal of discussion and on their own merits. There is no desire on my part to settle this issue in any other way, but I would enormously like to see us get that money. I believe we have a chance for it if we go at it in accordance with the rules of the game, and so far as I am concerned I would like greatly to get behind a movement of the state foresters and try to get out of congress what we want.

Mr. PETERS. I would like to correct Mr. Pinchot in one particular with reference to the bill that he mentions. The item in question was not prepared by the great lumber interests, but the wording of that bill was prepared by Mr. William L. Hall.

Mr. CHEYNEY. As I see it, it is no longer a discussion of a point or policy, or whether it is one thing or the other. It has gotten down to a point of the wording of a bill. It is whether the bill can be put in such shape that it can go through. It does not seem to me that we are justified, or would be justified, in putting up something that has a possibility of being objectionable, that is, if the objectionable features can be taken out; and it looks to me as though they could be taken out without in any way influencing the effect of this bill. It might well be, as a permanent policy, as Mr. Pinchot says, that a permanent policy can not be settled in an item of a fiscal bill; it has to be settled on another basis. The only effect that the difference between these two bills could possibly have would be on action that might be taken a number of years from now, whether this matter is put in the present form in which it is worded in the bill or whether it is simply made in the wording as the Week's law has it. There would be, in my opinion, absolutely no difference in the things that are accomplished in the next two or three years under these two bills. We cannot hope to get any kind of control measure through in the next year, as I see it. It will simply be a question of getting more money to be expended in exactly the same way as the Week's money has been expended in the past, and if the wording of the Week's law can be retained and exactly the same things done under it as we can do under this bill here, then any wordings that we change now are simply so many hurdles that we are sticking in the way of its passage. If we can stick to the old wording and stand a better show of getting the money, it seems to me that we ought to do it. Later on we can take up the question of policy. Later on we can find out what we want or what we do not want on this particular point. So far as this argument goes, it seems to me to be a purely academic discussion of the wording of the bill.

Mr. PINCHOT. May I perhaps contribute this to it? I was in Washington and saw Haugen, chairman of the committee of agriculture; Kenyon, of the committee of agriculture and committee of appropriations of the senate; Capper, who is one of the most influental menmbers of the committee on agriculture; and Lenroot, who would have been speaker of the house had he remained there, and is one of the two or three leaders of congress. I asked their judgment, and Lenroot and Capper wrote me letters, copies of which I have in my possession, in which they stated there was absolutely no chance whatever in their judgment of the passage of items of this sort, and Kenyon and Haugen authorized me to quote them to the same effect. That comes back to another question of opinion, if you like; but it is the opinion of men who have some right to know. I think you have a right to know in detail what my best judgment is, and I can back that up so far as my own opinion is concerned and my experience of some years in dealing with these matters in congress.

Mr. PETERS. I would like to ask Mr. Pinchot, if he is at liberty to give the information that he has secured from the gentlemen mentioned, whether they thought the Week's law fire-protection item could be increased to anything like a million dollars?

Mr. PINCHOT. I am sorry to tell you that question did not come up. I am at perfect liberty to tell you anything they told me. I should say there is no doubt, under all the circumstances, that we should take the wording that is familiar to the House and already approved by it, and tie your appropriation to that wording. As I said yesterday, these appropriation bills pass during the final hours of the session. Nobody has much chance to enter into fine points, and decisions are taken broadly. If a member don't like a thing he makes a point of order against it. If he makes a point of order against an item, you have a great deal better chance, obviously a great deal better chance, if the thing is in language that is clear and familiar both to the house and senate.

Mr. MORRILL. Much of this discussion is a mystery to me, because I have been situated where I have not come into contact with it. I am probably denser than most of you in regard to the matter. I would like to ask Mr. Peters, if he is willing to inform me, just what the objection would be to the forestry service bill if it adopted the suggestion made by Mr. Pinchot and Mr. Cheyney and others. I do not quite understand.

Mr. PETERS. Mr. Chairman, in answering the gentleman's question I would say that the Week's law item provides for one thing, fire-protection. The other language provides not only for fire-protection, but also for reforestation, management-work, and whatever else might be necessary to keep forest lands productive.

Mr. MORRILL. It covers a much broader field.

Mr. PETERS. A very much broader field.

Mr. CHEYNEY. So the use of this money for such purposes as planned, which might very reasonably be construed as a matter of protecting navigable streams and certain other methods of fire-protection there, and possibly certain matters of management, (whether they would be included in the Week's law or not,) would be largely a matter of interpretation.

Mr. PETERS. Absolutely not included. That point has come up.

The CHAIRMAN. Are there any further remarks on. this question? It impresses me that this is a very vital question all the way round to some of us, and I know Mr. Morrill is in the same position that I am. There is a sort of mystery about the whole thing that I can not penetrate, and it seems to me that a good, full and frank discussion all the way round would certainly be advisable.

Mr. PETERS. Don't you think that Colonel Greeley's talk yesterday was clear? And did you get a copy of his Madison talk?

The CHAIRMAN. Yes, sir.

Mr. PETERS. Have you read it?

The CHAIRMAN. Yes, sir.

Mr. PETERS. You could not understand it?

The CHAIRMAN. I understood it perhaps. It seems to me there is something more back of the whole subject, however, than I have neither heard nor read so far.

Mr. BAZELEY. Is not the whole thing back of this situation, when you get right down to it, that there is a great question coming before all the men interested in forestry, the question of federal control or state control? Now, from what I have read in the papers lately it seem to me that there is very little chance of increased appropriations being made by the present congress for any of the specific governmental activities. It seems to me that unless the department is going to show that the increased appropriation it is asking for is going to be used for its activities it has not got a chance. I do not believe, no matter how important the question of fire is, that there is any chance of a million dollars being granted by this present congress. If that is all that is going to be put into the bill I think congress will stick to just what they have allowed before without any increase whatever. Now, that is the way I have gathered it from reading the papers, from talking with several congressmen who are talking about the size of the budget; and that brings me down to the thought, as an old legislator, of what is going to happen if we go in with the decided stand that we are going to take a million dollars for state cooperation instead of one hundred and twenty-five thousand dollars, winking at the fact that we do not say anything at the time about state or federal control, but with a majority of the states at the present time I believe against federal control. Now, I believe if we say that we will stand for the bill we wink at the fact that we are asking for a million dollars which will lead to federal control in the future, and that we are a great deal better off by taking the one hundred and twenty- five thousand dollars for the next year and waiting until the fight is completed to see whether we have federal control or state control. I know in Massachusetts we feel there has been too much federal control, and it is no time for us to bring to any of our citizens any more talk of federal control in anything like the near future. Cooperation? All right. I think cooperation will increase our budget if we can cooperate with the federal government, but if there is federal or state control I should not have a chance to get this before our budget committee and get the money to carry out my part of the protection.

Mr. PINCHOT. May I just say that I think Commissioner Bazeley misunderstood the suggestion that I made? I am a strong believer in federal control, but I believe a tendency to push a decision in any direction in this million-dollar thing would kill it at once.

Mr. HASTINGS. I am glad to see the discussion run high, because I want your best thought here to express itself for my benefit. Perhaps I can not "get it" as quickly as the rest of you members have, or perhaps as quickly as the gentleman who is occupying the chair, and I therefore hesitate to trespass further upon your time, but I imagine I see something beyond and behind this controversy. I do not know, but I wonder if Mr. Pinchot could not tell me whether or not a few words could be added to or subtracted from the proposed legislation which would clear matters in his mind. I do not know that it would clear up the subject in my mind, but would it in yours, Mr. Pinchot?

Mr. PINCHOT. If I may answer that question, I suggested yesterday, or intended to, that there are about two or two and a half lines in one place and one word in another place in the bill which carry the state-control point of view. This, of course, could be eliminated. I am strongly of the opinion, however, merely as a matter of practical results, that if it were possible to secure a short form of wording such a form of words would have a better standing than a long and somewhat involved and difficult item.

Mr. GASKILL. Are we not really agreed upon the essentials of this whole situation, which are that there shall be provided by Congress a greater sum of money available for cooperation with the states? Now Mr. Greeley, representing the forestry service, has proposed something; the Secretary of Agriculture has approved it, and it goes before Congress with their support. Mr. Greeley has stated his program in detail. It is clearly up to him, to my mind, to take such action as will secure the desired results. I do not believe that Mr. Greeley, any more than Mr. Pinchot, has any other desire than that, fundamentally and first of all, there shall be secured that million dollars, or as much of an increase over the present appropriation as Congress can be induced to make. I question very much whether in discussing this question here and in this way we are not more or less beside the point. The responsibility or obligation to do the necessary and proper thing is with the Secretary of Agriculture, supported by Mr. Greeley; and very frankly I do not know that it matters a great deal what may be in the minds of some of us with respect to the procedure on various underlying points. It all comes down to the one question of how Mr. Greeley and Mr. Secretary Meredith are going to secure what they want, and what we want, and what we are all agreed that we want. For one I feel very strongly inclined to say, let us trust the forestry service.

Mr. LOVEJOY. May I inquire of Mr. Gaskill what, in his opinion, the forest service might do to further the passage of this bill, in view of the facts as related by Mr. Pinchot concerning the specific statement made by leaders of the house and senate?

Mr. GASKILL. Answering Mr. Lovejoy's question, it is perfectly obvious that it is their obligation. They have undertaken to carry this thing through. The means are clearly in their hands. We have a difference of opinion as to procedure, as Mr. Peters has suggested. Now, opinions don't go, and I can not but think that it is directly up to the people who are going to conduct the negotiations at Washington. We have all said we want the money. We have all said we are going to back the forest service in the efforts to get it. Now let us help them get it. Stand up. I don't mean hands off, if we can do anything; but let us not do anything that will mess things up.

The CHAIRMAN. Are there any further opinions? Is there any other buisness to come before the meeting

Mr. PINCHOT. May I just ask one more question? And then I am through. If I understand the suggestion made by Mr. Gaskill, it is to the effect that we hold off and see what the forest service is going to do and then get in behind it so far as we can. I am very strongly in favor of getting in behind it an helping it all I can, but I do believe, subject, of course, to the better opinion of everybody here, that unless Mr. Peters has got a fair impression of what this outfit wants he ought to be given that before he leaves here so that he can report it to the authorities at Washington. I do not know whether he has or not.

Mr. PETERS. Well, beyond what has been said here this afternoon and beyond what was declared at the Atlantic City meeting, I do not know that there need be any additional information.

Mr. PINCHOT. If you are clear in your mind of what this crowd wants, that is all I wanted to know.

Mr. PETERS. I think I have the point of view of the various State Foresters.

Mr. PINCHOT. That is, on the big question. I mean on this matter of appropriation.

Mr. PETERS. You mean following Mr. Gaskill's suggestion that we leave it to the Secretary and the Forester to try to secure the appropriation from congress?

Mr. PINCHOT. Here is what I want to get at. I have one opinion, and I have expressed it; some of the other gentlemen have opinions which they have expressed; some have opinions they have not expressed. I think it would be a very valuable thing for the purpose of getting the money if you could have, either by private conversation with those who are here, or by whatever way you choose to get at it, the opinion of each of us as to what he really thinks, in order that you may report that to the one man, as Mr. Gaskill very wisely says, who has the right to introduce an item and push it.

Mr. PETERS. There are some State Foresters here whose views I do not know.

Mr. HASTINGS. I got one of my questions answered. May I ask Mr. Pinchot whether or not certain things could be stricken from the bill which would relieve the situation? As a secondary question I should like to ask Commissioner Bazeley whether or not the suggested omission would in any way in his estimation jeopardise the securing of the million-dollar appropriation?

Mr. BAZELEY. I believe that unless you have an explanation to give in asking for one million dollars instead of one hundred and twenty-five thousand dollars there is not the chance of a snowball on a red-hot stove of getting it from this congress, because I know. I have just been having a conversation with some men on another agricultural item which is absolutely necessary, that is, on the gypsy-moth item, where they are asking for a supplementary appropriation on account of an outbreak of the gypsy-moth devastation in three states, which if it is not handled immediately will come down to the same proposition we are up against in Massachusetts; and they said even with that very great emergency they doubted very much whether any additional sums could be added to the gypsy-moth appropriation, but they though that on account of that emergency it might be. So that I believe we have some chance for the fire-protection, but there is no chance of getting additional appropriation for other expenses.

Mr. HASTINGS. Do you think there is a chance for additional appropriation if it cuts off the state control?

Mr. PINCHOT. Are you asking me?

Mr. HASTINGS. Yes, sir, if you please.

Mr. PINCHOT. The new language is the whole item that has been suggested, and the whole item is, in my judgment, subject to a point of order. The special point to which objection was developed during my trip to Washington was that particular feature which establishes state control, which is a very big new policy.

Mr. HASTINGS. It seems to me that the logical thing to do, for I still want to keep my mind open for every tip and enlightenment, the logical thing to do would be to remove from the bill the particuler features which Mr. Pinchot found so objectionable in the minds of certain leaders in the house and senate, but to include sufficient new matter which, in the judgment of Commissioner Bazeley, would insure the securing of a larger appropriation for cooperative work among the states. Now, I am not saying that that is my fixed opinion. I am simply suggesting it, and I am seeking for light and information. I have tried hard to see both Mr. Pinchot's and Mr. Peters' side of the question, but I feel there are still some things that have not come out as plainly as they might.

Mr. BESLEY. I think the situation is something like this. The Week's law calls for an appropriation of one hundred and twenty-five thousand dollars. That is independent from this other measure. If this bill is introduced, and if we eliminate to answer Mr. Hasting's question, if we eliminate that one item of control, still it would be open to the objections Mr. Pinchot mentioned yesterday, because there would be some new language, and it would be thrown out on that account if objection was made. But does it lessen our chances of getting a substantial appropriation from congress by introducing this bill? I agree with Mr. Bazeley entirely that if we simply eliminate everything but fire-protection and go before them for an appropriation of a million dollars there is no chance of getting it. They would say you have been getting along with one hundred and twenty-five thousand dollars, and we do not know if you have spent exactly all of that; and with the present feeling toward economy the chances are we would not get any more now.

We have the same chance of getting one hundred and twenty-five thousand dollars and the additional one of presenting this new matter and enlarged program, with the possibility of getting one million dollars in place of one hundred and twenty-five thousand dollars. I do not think that we are going to lessen our chances of getting one hundred and twenty-five thousand dollars through the Week's law by introducing this other measure; but I rather think it is going to emphathize the importance of increasing the appropriation, and thereby increasing our chances of getting a great deal more money out of congress.

Mr. PETERS. Mr. Chairman, I dislike to prolong the discussion beyond reasonable bounds myself, but I can not see how the passage of this item would in any way operate against the additional passage of such legislation as Mr. Pinchot or the committee of the society of American foresters has in view. Now, it strikes me that this is a pertinent question, Mr. Pinchot. If you were advocating Federal control of child-labor, would you object to the states passing child-labor legislation?

Mr. PINCHOT. May I answer that question? Not in the slightest. I hope the state will pass all the legislation it can to prevent forest devastation; but if I were advocating United States control over child-labor then I would object to the United States passing legislation which turned it over to the states. Do I make the distinction clear? Whatever the states do of their own accord will be welcome; but I would object, under those same circumstances, to the United States passing legislation which turns the question over to the states.

Mr. PETERS. This legislation provides a cooperative fund for advancing money to the states if the states do certain things. It encourages the states to adopt adequate measures. I do not understand you about turning something over to the states which the states already have.

Mr. PINCHOT. Let me give you a concrete illustration in this way. Secretary Meredith told me that the object of this wording was to incorporate the policy of state control. That being true, as I, of course, assume it is since the Secretary said so, and since I naturally want national control—

Mr. PETERS. As I see it, if at any time federal control seems desirable and the people want it, then irrespective of what the states may have done the Federal Government will take control. I fail to see how by encouraging the states now any obstacle will be put in the way of Federal control in the future, provided the people want it.

Mr. PINCHOT. Let me answer that in two ways. In the first place, it is no less than one hundred times easier to stop the passage of a bill in congress than it is to secure the passage, as Mr. Besley well knows. Moreover, once you have adopted a policy precedence is so strong that it would become very hard to prevent the passage of state control enactments.

Mr. PETERS. Maybe congress would simply consider that as a succession of steps in the enactment of legislation for Federal control.

Mr. PINCHOT. In the second place, I do not think my information on the matter is of any consequence at all. I think the essential fact is that certain leaders have told us that that particular thing can not go through, and I think they have sufficient position so that you have got to accept what they say. We know, so far as we can know anything, that the item which is subject to a point of order by a single man can not go through.

Mr. HASTINGS. If I may have one more moment, I simply wish to apologize, if you will, for occupying so much of your attention. I did it for this particular reason: A month ago I did not understand the subject at all as I should and my effort to get enlightenment at Atlantic City failed. I have gotten a great deal of information today but I still do not understand the whole question sufficiently so that I will feel justified in getting behind this particular measure and crowding it forward. I do not mean that I am reserving whatever infinitestimal power I might have to help put a bill through congress. I am willing to do my part, but I did not know from the information I had which was the better way to push—forward or backward. I have been hunting hard for the information needed and have gotten enough of it today to shape my future actions.

The CHAIRMAN. The time has come for the closing of our session unless something further is desired to be considered.

Mr. PINCHOT. May I say just a word to the foresters? I want to express, Mr Chairman, with your permission, the very great gratification that I am sure every member of the Pennsylvania Department of Forestry feels who has had the opportunity, and the most delightful one, of entertaining the visiting foresters. It has been to me a perfect delight all the way through, and it seems to me that our discussions here together may lead to a repetition of the gathering. So far as I am personally concerned. I wish to apologize to you gentlemen for having been so fully occupied during the intervals between our meetings, and yet I know you understand. There have been certain questions not relating to forestry which had to be handled during this time, which have made it necessary for me to be away except during the actual meetings.

I do want to express for myself and my colleagues our very profound satisfaction that you were good enough to accept the invitation of the governor, and I hope that when the time rolls around Pennsylvania may once more have the opportunity of entertaining the association of state foresters under the presiding genius of the governor of Oregon. (Applause).

The CHAIRMAN. I just wish to say I think I voice the sentiment of every man in the association of the delightful and profitable time that we have enjoyed here. It has been a real pleasure to associate with the state foresters. I carry back to the Pacific coast, back to the Pacific northwest, only the most pleasant memories; and I want to personally thank each and every member of this conference for his uniform courtesy and kindness to me.

Mr. Pinchot the other day, just before I left for Philadelphia, asked me if I would serve as chairman of this conference. I thanked him and declined, although I appreciated the honor, for the reason that I have never presided at any thing of this kind. I finally screwed up my courage and told Mr. Pinchot that if you wished me to serve I would do my best. You have been very kind to me, and fortunately you did not get into complications on parliamentary law, or you really would have found out how little I know.

I want to thank you from the bottom of my heart for the gracious way in which you have treated me.

Mr. GASKILL. Mr. Chairman, I move that the conference do now adjourn.

The motion was agreed to, and at 4:35 o'clock P. M. the conference adjourned.

MAY 12

THE PENNSYLVANIA DEPARTMENT OF FORESTRY

REPORT OF

CONFERENCE OF WOOD-USING INDUSTRIES

HARRISBURG, PENNSYLVANIA

APRIL 14 AND 15, 1921

BULLETIN NO. 24

MAY, 1922

GIFFORD PINCHOT, COMMISSIONER

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST COMMISSION

Gifford Pinchot, Commissioner of Forestry.
Dr. J. T. Rothrock.
Edward Bailey.
Henry W. Shoemaker.
Mrs. John L. Lawrence.
(Mary Flynn Lawrence.)

Robert Y. Stuart, Deputy Commissioner of Forestry.
Alfred E. Rupp, Chief, Bureau of Lands.
Lewis E. Staley, Chief, Bureau of Operation.
George H. Wirt, Chief, Bureau of Protection.
John W. Keller, Chief, Bureau of Silviculture.
W. E. Montgomery, Chief, Office of Maintenance.
A. O. Vorse, Chief, Office of Information.
Joseph S. Illick, Chief, Office of Research.
E. A. Ziegler, Director, State Forest Academy.

THE PENNSYLVANIA DEPARTMENT OF FORESTRY

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VIRTUE
LIBERTY AND
INDEPENDENCE

THE PENNSYLVANIA DEPARTMENT OF FORESTRY.

PROGRAM FOR CONFERENCE OF WOOD-USING INDUSTRIES

HARRISBURG, APRIL 13-14, 1921.

April 13, 1921 (2 P. M.)

Hon. Wm. C. Sproul, Chairman.

Address by the Governor—The Forest and the State.

Where Our Lumber Comes From—Geo. E. Lippincott, Philadelphia.

The Forest and the Railroad--W. B. McCaleb, Pennsylvania R. R. Co.

April 13, 1921 (7:30 P. M.)

The Forest and the Press—E. J. Stackpole, Editor and Publisher, Harrisburg Telegraph.

The Forest and the Farm—John A. McSparran, Master State Grange.

The Forest and the Housekeeper--Mrs. George W. Dibert, Johnstown.

April 14, 1921 (9 A. M.)

The Forest and Industry--W. L. Cumings, Bethlehem Steel Co.

The Forest and Wood Substitutes--Harold S. Betts, U. S. Forest Service.

The Forest and the Mine—Benjamin M. Clark, Punxsutawney.

April 14, 1921 (1:30 P. M.)

The Forest and Labor—John A. Phillips, Vice-President, State Federation of Labor.

The Modern Trend of Wood Consumption—Ovid M. Butler, U. S. Forest Service.

Why We Need the Forest—Gifford Pinchot, Commissioner of Forestry.

REPORT OF

CONFERENCE OF WOOD-USING INDUSTRIES

HARRISBURG, PENNSYLVANIA

APRIL 13 AND 14, 1921

FIRST DAY — AFTERNOON SESSION.

The Chairman, Honorable William C. Sproul, Governor, was introduced by Honorable Gifford Pinchot, Commissioner of Forestry.

THE FOREST AND THE STATE

by

GOVERNOR SPROUL

Mr. Commissioner and Gentlemen—Ladies and Gentlemen, I correct myself; you always find that the ladies take an interest in public matters now, and it is very gratifying to have them represented here; and what an encouraging and heartening thing it is to see so many business men, men of large affairs, people who are interested in the real, vital, constructive work of the future of Pennsylvania, taking the time to come here today to this meeting, the first time, I believe, any meeting has been held in the State to consider this great industrial question which really is more important than most of us realize. It is heartening to those of us who are here, considering and thinking of these things, to have you take the trouble and the time to answer the call, and I want to thank you all for your presence here. I have a few statements and figures here which may be of interest and with which I will open the meeting. You may not realize it, but there is no industry in Pennsylvania that can be conducted without the assistance of the forest and its products to a greater or less extent.

For the first time in the history of this great Commonwealth representatives of wood-using industries have come together to consider the vital question of forest supplies and the effect of forest devastation upon agriculture, commerce, and manufacture in the Keystone State. There is no industry in Pennsylvania that can be conducted without the assistance of the forest. Not a pound of coal can be mined, not a pound of steel can be produced, nothing can be transported without the help of the forest. Therefore, in fact and in effect every industry in our State is directly dependent for its existence on supplies which the forest alone can yield.

In addition to sawmills and manufactures of lath, shingles, cross ties, pulp wood, and other rough material out of wood, there are more than 5000 factories which take rough wooden materials and convert them into final form. Taken together, these wood-consuming industries make the second most important group of the State's manufacturing enterprises. Their annual product is about $100,000,000, their capitalization more than $63,000,000, and they give employment to nearly 100,000 wage earners, many of whom are skilled mechanics.

In 1850 Pennsylvania stood second among the States of the Union in lumber production. In 1860 she took first place and held it until 1890. In 1900 she fell to fourth, and by 1918 she had fallen to twentieth, or almost to the foot of the list of wood-producing States.

If we set Pennsylvania's production of lumber against her population, we find that thirty years ago her mills were turning out 420 board feet for every man, woman, and child in the State. By the beginning of the century this figure had fallen to 390. In 1910 it had dropped to 162 board feet per capita, or just about the rate of consumption in the United States today. By 1918 Pennsylvania's per capita production was 63 feet, and today it is estimated at 50 feet, or about one-fifth of what our people are using. It takes about 50 board feet to build a coffin. In other words, Pennsylvania's forests today are producing enough to bury her people but not enough to keep them alive.

Since Pennsylvania produces only one-fifth of the wood necessary to keep her industries alive, it is important to remember that of the States which surround her, West Virginia alone is not a wood importing State. Our timber comes mainly from the South, and today the annual timber shortage in Pennsylvania almost exactly equals the total exportable surplus of West Virginia, Virginia, North Carolina, and South Carolina; and the forests of all these States are being rapidly exhausted.

Before very long, to the great disadvantage of our industries and the great disadvantage of the State as a manufacturing State, and as a centre for great industrial enterprises, we shall have to bring the lumber that we use here from great distances and at high cost; a matter which will be of great importance to every mining, industrial and manufacturing enterprise in Pennsylvania.

I think you will agree with me when I say that there is today no more pressing industrial question than the problem of where the agriculture, the industries, and the transportation of Pennsylvania is to turn in the near future for the wood without which our people cannot live nor earn a living.

Now we have made a start here in the State in at least attracting public attention to the necessity of doing something in this particular line. We have a long way to go, a great many things to do. we will have to spend some money on it; but above all other things, we have got to arouse public interest to the fact that a crisis confronts us which is a crisis that if not met will be a tremendous reflection upon the good sense and good judgment and public spirit and the business sagacity, to say nothing more, of the people who are living here just about this time. Some day in the future when the people of another age dig up the remains of Pennsylvania civilization, if we let things go to decay, the archeologists of that time are going to wonder what kind of a crew infested Pennsylvania and allowed Pennsylvania's great wealth to be destroyed.

This forestry proposition is one of the extravagances with which we are being charged. We have several of them. We are trying to take a little bit better care of our schools; we are trying to place the State a bit nearer the front in the place where she deserves to be in regard to the maintenance and efficiency of her public schools. My friends, it is the best guarantee that we can have, the best insurance we can have, as to the future prosperity of Pennsylvania and the perpetuity of these institutions of ours which we think are about right. They accuse us of our extravagance in roads; but, if this State is not big enough to have better roads than Pennsylvania has been noted for in the past, I have misjudged our people; I have misjudged the public spirit.

The forestry proposition, I say, is another thing. It will require additional funds to go along with this program; but if the schools and the roads and the forestry are not worthy projects, why then this administration is guilty of extravagance. I just want to tell you we are not looking toward putting Pennsylvania among the heavily taxed States of the Nation; we are not looking toward any great expenditures or anything of the kind. It is interesting to me to note that the Governor of New York has just signed the appropriation bill over there calling for $136,000,000. We have five-sixths as many people here in Pennsylvania as they have in New York, and I think they are just as good people, just as well-to-do, and in the same proportion we are entitled to spend $112,000,000. in this one year, but we only expect to spend that much in two.

I do want your support and enthusiastic help in trying to meet a real crisis in this forestry business. I have brought a gentleman, Mr. Gifford Pinchot, into the public service; he says I drafted him, and I guess I did possibly; but I don't think you could have kept him out with a yoke of oxen, because he wanted to go to work. He said he had been used to working with national projects. "Well," I said, " this State is as big as a nation; there are nine million people in Pennsylvania, as much as eleven States put together west of the west line of the Dakotas, extending clear through to the Gulf of Mexico, and where most of the national forest projects were located." Nine millions of Pennsylvanians would be benefitted by the extension and the care of our forests. In the six States adjoining and with Pennsylvania's population included there are more than one-third of all the people in the Nation; so it does seem important that we should set a scale right here in Pennsylvania of doing things. We have the opportunity for doing it; all we need is the disposition and the public sentiment which will warrant us in going ahead as rapidly as the State's means will allow and upon a conservative basis, in bringing back to Pennsylvania a condition by which we will be able to become at least nearly self-supporting in the timber products.

That we can't be self-supporting for a good while we know. but we want to relieve ourselves of the burden of turning this over to our sons or successors. Before we quit, if we live out the natural expectancy of our lives, before we quit we want to see that the lumber situation and the wood situation in Pennsylvania is going to be conserved for our industries. If we don't, it is going to give great advantages to similar industries located in other directions, especially now when high freight rates and high charges for transportation every where are such an important factor. My only desire is that we get awake so that we can see the importance of it, and I think we are making a very gratifying step today in getting all of you to come here to listen to what we have to say, and to at least have an opportunity of sympathizing with us in what we are trying to do.

WHERE OUR LUMBER COMES FROM

by

GEORGE E. LIPPINCOTT.

It is a most startling fact in connection with my subject, as it affects the use of lumber in Pennsylvania, that eighty per cent. of the lumber at present consumed in Pennsylvania is brought in from other States. Pennsylvania's lumber demands of today differ little in kind from the demands of a generation ago, yet in that time we have seen our State fall away from the position of more than supplying her own lumber needs to a position where we must go so far away for our lumber that our annual freight bill alone amounts to more than $25,000,000. Only last year I made a mill contract in northern Canada for lumber of a quality which by all that is reasonable should be grown in such quantity right here in Pennsylvania as to supply all of the needs of the Pennsylvania trade.

Shipments of Douglas fir timbers from Oregon, several boat loads of anthracite mine props, have recently been brought to Pennsylvania by way of the Panama Canal in competition with the rough piling from the Carolinas. Pennsylvania until a few years ago supplied all of its own mine props.

In 1918 Pennsylvania consumed 2274 million board feet of lumber and produced but 530 million board feet.

In considering the situation as it affects Pennsylvania we must remember that there are within reasonable distance of Pennsylvania but six States that are lumber exporting States, and that Pennsylvania's importing demands practically equal the combined exportable surplus of these six States. We must go to Michigan for our maple flooring; yet Wisconsin is today producing less lumber than half the second growth cut of either Maine or New Hampshire.

Just as the soft wood sources of supply have slipped gradually further and further away from Pennsylvania, the hardwood production has moved from one region to another until the only remaining reserve is in the lower Mississippi Valley, and production there has probably reached its maximum. The oak from this region is hard and flinty, not to be compared in softness with our Pennsylvania oak. The future hardwood production of America must lean heavily upon the Appalachian range, and this means Pennsylvania, providing the reforestation of our splendid hills, ideally adapted to the production of the oak and other important hardwoods, is taken care of.

Water borne traffic of a generation ago brought lumber to Philadelphia at a minimum of expense, possibly $1.50 to $2.00 a thousand feet. Subsequently the movement of western Pennsylvania lumber and still later that of the Lake States was by rail, and the transportation tax increased to $2 or $3 a thousand feet. Today in Philadelphia the freight on rough lumber amounts to from $8 to $10 on North Carolina pine, $20 to $25 on Southern Yellow Pine, $20 to $23 on southern hardwood, while the freight charges on Douglas fir loom large at from $33 to $38 a thousand feet. In many instances present day freight charges are equal to the former cost, laid down in Philadelphia, of Pennsylvania's justly famous cork white pine.

To summarize upon the subject assigned to me, our Pennsylvania lumber comes from almost everywhere else than Pennsylvania; it comes at increasing cost both for material and transportation; the ability to secure it grows increasingly difficult, and the situation is decidedly serious to the business life of the Commonwealth. If I may suggest a remedy for the situation it would be that Pennsylvania take immediate and adequate steps to put her own house in order for the production of her own timber needs—a thing she can do and by all means should do.

THE FOREST AND THE RAILROAD

by

W. B. McCALEB.

Mr. Chairman and Ladies and Gentlemen: The subject assigned to me, "The Forest and the Railroad", is one which should be of particular interest just now because both the railroad and the forest are matters or subjects which are very much in the public eye, and both matters, or businesses if you would so call them, which must receive serious consideration at the hands of our law-makers as well as from business men.

The early settlers of eastern United States found a region which, due to natural conditions, was forest covered. In order to be able to support themselves, it was necessary to clear lands for agricultural purposes as soon as possible. The first railroads constructed were short roads from coal mines to water courses, so that it can be said that coal was the natural resource originally responsible for railroads, while timber has been most often the natural resource responsible for the construction of railroads. Many railroads were first constructed as log roads and were maintained after cutting of the timber had been completed. The production of southern yellow pine lumber coincides with the increase in the mileage of railroads in the South. Likewise the development of the Pacific Northwest has been built upon the interdependence of the forest and the railroad.

Railroads are interested in forests at the present time chiefly from two standpoints; that of being extensive users of forest products and as carriers of such products. Railroads are probably the largest timber consuming industry, and it is estimated that their annual requirements are approximately seven billion board feet, including one hundred million cross ties. Products of the forests required over three million cars for their transportation in the United States during 1920, constituting one of the largest individual items of freight traffic.

At one time Pennsylvania was the leading State in the production and manufacture of forest products. It ceased to be self-supporting in the 80's insofar as the production of lumber for railroad cars is concerned. In the 90's it was necessary to go outside the State for cross ties.

As it became necessary progressively to go greater distances in order to secure lumber, prices at the point of consumption greatly increased, but at the same time it become possible to extend the markets of manufactured products by providing a return haul where previously it had been necessary to haul empty cars back to the manufacturing centers. Railroads have made the utilization of timber resources possible through bringing to distant markets the products of forests that would otherwise be not available.

At the present time the ties not procured locally are chiefly obtained from southern States. During the past two years, owing to inability to get ties as needed from nearby points, it became necessary to secure fir ties on the Pacific coast and transport them to the Atlantic coast, mainly by way of the Panama Canal. At the present time only ties of the naturally durable woods are used without treatment. With proper treatment the non-durable cross ties have a life longer than that of the naturally durable woods used untreated. This treatment adds to the cost of the tie, and as it is necessary to use tie plates to enable treated ties to wear as long as they will last the result is that the present cost of treated ties with the necessary plates is more than two dollars each, which is more than double the cost of a cross tie ten years ago.

In view of the enormous demands of the railroad for forest products and decrease in the supply, early efforts were made to substitute other materials for timber for various purposes, with the result that between 1910 and 1920 use of dimension lumber was reduced by one half. Frame buildings have been supplanted and replaced by more permanent types of structures, such brick, steel and concrete; wooden platforms have been replaced by concrete and brick, frame trestles have been replaced by earth embankments, and very few frame trestles, even on new lines, are constructed at this time. Steel cars have largely replaced frame cars on many railroads. In spite of the growth of the use of steel cars, the railroads require very large quantities of high grade lumber for car purposes, constituting after cross ties the largest item of consumption. Many cars with steel underframes and timber bodies have been built recently, which, together with the lumber required for repairing existing wooden cars, accounts for this. Extensive efforts have been made to find a substitute for wood cross ties. Many patents have been granted for various substitutes, experimentation is still under way, and in many cases actual trials of various substitutes in the track are in progress. The Bessemer and Lake Erie Railroad, controlled by the United States Steel Corporation, are using extensively a steel tie in the shape of an I-beam. Among the types of experimental cross ties which have been used by the different railroads, would mention the following: Light metal trough filled with asphalt; a tie built up of various shapes of steel; a channel of rolled steel placed upside down with blocks on same to support the rail; concrete tie 8 X 8 inches; blocks of reinforced concrete lengthwise under the rail and tied together with rods; a permanent roadway of cement with wood blocks to support the rail has been used to some extent in tunnels. It should be noted that in many of the types of experimental ties wooden blocks are used under the rail. None of these substitutes have so far proved satisfactory, either as to cost or service, and railroads are compelled to continue the use of wood for cross tie purposes.

There is another tie which I neglected to mention—that is the laminated wood tie, made up of small pieces of wood and fastened together with glue and possibly with bolts. I understand that they claim to have found a glue recently which will withstand the effects of the weather indefinitely. While this is a change in the design of tie, you will note it is a tie made of wood.

Railroads, as large users of forest products, have made extensive efforts to conserve and increase the supply of timber. Through the standards of the American Railway Engineering Association and the Master Car Builders' Association, only kinds and grades of wood designed to give maximum service are recommended practice. Some of the extensive railroads maintain departments which perform one or more of the following duties: Inspect lumber; give technical advice in connection with its use; supervise wood preserving plants; establish forest plantations on lands not required for operating purposes; formulate working plans for the sale of standing timber and the prevention of fires on company forest property; estimate timber stumpage on properties to be purchased or sold; together with many other duties of a similar nature. Some railroads also advise timber owners as to the best method to cut their holdings in order to produce forest products for railroad purposes. This is particularly valuable in the case of small tracts, for large holdings usually are in the hands of individuals well acquainted with the most economical methods of cutting.

The present output of cross ties of Pennsylvania forests is estimated to be about 40 per cent. of requirements of railroads within the State, and is possible only because of the treatment with preservatives previously referred to.

You will note there were statements made in previous remarks, particularly by the Governor, that Pennsylvania is said to produce about one-fifth of the lumber within her borders which is used within the State. My figure here on cross-ties is two-fifths. While I did not have the opportunity to check it, at the same time I think it is apparent that you can more easily secure cross-ties out of our present stand of timber than you can dimension lumber, so that I believe that figure of forty per cent. for cross-ties is pretty nearly correct.

There began from 1909 - 1920 extensive preservative treatment of cross ties by the Baltimore & Ohio; Buffalo, Rochester & Pittsburgh; Delaware, Lackawanna & Western; Lehigh Valley; New York Central; Pennsylvania; Philadelphia & Reading; and Pittsburgh & Lake Erie railroads. These roads built or had built on their lines wood-preserving plants, of which four are located within the State. The consequent use by the above railroads of woods other than those fairly durable without preservative treatment increased for a time the production of ties along their lines.

It is believed that the railroads treat far more timber in order to increase its life than does any other industry. The use of treated ties is now acknowledged as generally economical practice. Prior to 1885 less than 100,000 ties per year were treated. By 1890 the number was 650,000; by 1895—1,300,000; by 1900—2,800,000; by 1905—14,900,000; by 1910—30,500,000; by 1915—37,000,000; and in 1920—40,000,000. Cross ties constitute about 80 per cent. of all wood given preservative treatment in the United States, and since railroads use the bulk of the construction timbers and some others among the items of treated wood, railroads can be given credit for over 90 per cent. of the forest conservation through wood preservation. One of the largest railroads in the State treats annually approximately one half of the ties which are placed in its tracks, and one-third of the total number of ties now in place on that road have been treated.

Great precautions are now taken by the railroads to prevent and suppress forest fires. The Pennsylvania System prints on all its lumber orders propaganda to impress on timber owners the necessity of protecting our forests from destruction by fire, and has issued instructions and posted notices along the right of way calling the attention to the necessity for the prevention and extinguishment of forest and grass fires. These notices are definite instructions to various classes of employes as to how they shall proceed to prevent forest and grass fires and the methods to be adopted in reporting and extinguishing fires which may occur on the right of way or vicinity. At a conference in Harrisburg last year, at which the various railroads and the State Forestry Department were represented, representatives of railroads agreed to the desirability of clearing and maintaining fire lanes 100 feet wide on each side of railroads through sections of wooded land, which the Forestry Department designated as forest fire hazards and where the Forestry Department was able to secure the consent of the adjoining owner to such clearing.

While in the past railroads have been accused of causing a great number of fires, it is believed that today they are devoting more serious effort to the prevention and extinguishing of fires than any other industry. Locomotives are universally equipped with spark arresters and devices for retaining cinders dropped from the boilers. Every effort is made to maintain such equipment and to guard against firemen dumping fires anywheres excepting at the appointed places where no danger of fire exists. Many fires which have been incorrectly attributed to railroads have actually been caused by men and boys.

Not only have the railroads contributed to forest conservation by the preservative treatment of wood and prevention of loss by fire, but they have doubtless done more than any other class of consumers or owners of timber lands in reforestation, the government alone excepted. More trees have been planted by railroads in Pennsylvania than in any other State by any kind of consumer, a total of 5,130,582 has been set out by the Pennsylvania System between 1902 and 1913. As early as 1870 certain railroads undertook such uses of such of their property as was available in the expectation that wood for their own uses could be grown, and by their example other land owners were led to do likewise. The fire hazard is the most serious risk confronting the growth of forests. Development of a plan of insurance by which this risk could be distributed and the individual owner protected would also encourage reforestation. The lack of success of this tree planting program may be attributed largely to ignorance regarding silviculture, destruction by forest fires and the failure on the part of the public to realize the impending seriousness of the situation.

In common with all other consumers of wood, railroads use the kinds best suited to their purposes as long as they are available economically. They first exhaust the supply adjacent to their operaions, and then draw on supplies elsewhere. In Pennsylvania railroads started with suitable material for all purposes at hand. The forests of the State yielded oak and pine in quantities and qualities entirely satisfactory. White oak was used for cars and ties and white pine for structures almost exclusively until 1890. Then southern yellow pine ties and timbers had to be brought in. By 1900 the importation of white oak had assumed large proportions in the purchases of ties and car lumber for railroads in Pennsylvania.

Accurate information as to the consumption and cost of forest products to the railroads of Pennsylvania is not available, but an idea of the magnitude of same can be obtained by consideration of the fact that the Pennsylvania Railroad alone pays out annually for lumber, cross ties, etc., used by it in the State of Pennsylvania about $7,000,000, representing approximately 200,000,000 board feet of wood. In order to meet the requirements of the railroads in Pennsylvania as to forest products, it is estimated that the cutting of about 300,000 acres of wood land, equal to the average Pennsylvania stand, is required annually.

The greatest difficulty in connection with reforestation is in the period of growth of the crop, which frequently reaches seventy-five years. This appears to indicate that reforestation is a proper subject for the activities of the State and Federal governments. The policy of the State of Pennsylvania in purchasing forest lands is greatly to its credit and will undoubtedly produce large profits for the State in the future if destruction by fire is prevented. It is to be hoped that the present session of the Legislature will appropriate a sufficient sum to enable the State to continue its policy of acquiring lands in the 5,000,000 acres of what has aptly been called the Pennsylvania Desert and to inaugurate a policy to fight fires.

In looking over the programme for the Convention, it is noted that the subject of "Forests and Water Supply" is not mentioned. The writer is of the opinion that a very important relationship exists between forests and water supplies, and large quantities of pure water are essential to the operation of railroads.

Many of the private water companies of the State have extensive holdings of forest land for the protection of the purity of their supplies. In general these lands are being handled with due regard to the perpetual maintenance of forest cover. The relationship between the flow of streams and the forest cover on their water sheds has a bearing on this subject. While there is doubt as to the ability of forests to prevent extreme droughts or floods, the writer believes that it is generally accepted that forests have a material influence in regulating the flow of streams by decreasing erosion on the water sheds and preventing the silting up of channels. In fact the latter relation is the principal reason for the passage of the Weeks Law under which the Federal government is purchasing large tracts of lands for the creation of Eastern National Forests. No purchases by the Federal government have been made in the State of Pennsylvania, as the Act of May 11, 1911, providing for the cooperation which is required under the Weeks Act is not satisfactory to the Federal government, but it is hoped that this obstacle will soon be removed by our Legislature.

It may be of interest to you to know that that bill came up again today in the Senate, and I was told that it passed by forty to one. It had already passed the House, so it is in a fair way to become a law.

In conclusion the writer would add that the high cost of lumber must be reflected in high transportation costs as measured by freight and passenger rates, and further desires to emphasize the fact, which he has tried to explain in the foregoing paper, that notwithstanding the efforts put forth by the railroads to conserve timber in many ways, they are now using and must continue to use indefinitely large amounts of the products of the forests.

Mr. PINCHOT: Mr. Lippincott's paper gave you, the general outlines. Of the 822,000,000 acres of virgin timber that we once had, we have now 137,000,000 acres left, containing three-quarters of the standing stumpage of the United States. It is being cut at the rate of 5½ million acres a year. If we do not export any more of it, if we do not use any more of it than we are using already, the virgin timber supply at present rate of consumption will be gone entirely within twenty-five years.

You don't have to wait for the exhaustion of an absolutely necessity of life to get into trouble about it. For example, the lumbermen figure that the increased freight rate for this eastern country, when we have to go to the Pacific Coast as against the South, will amount to $10.00 a thousand feet. If that were the only thing to be considered, it would still be a matter of very great importance to industry in every branch.

Recently I asked Mr. Vauclain, of the Baldwin Locomotive Works, how much wood it required to crate for exporting an American locomotive. He told me it takes a carload of lumber, in round number 20,000 feet, to send a locomotive out of this country. The automobile industry of the United States uses 500,000,000 board feet a year. Now 500,000,000 board feet is more than the total lumber production of the state of Pennsylvania.

We have got not only to consider what we can grow at home, what we can grow in the United States, but what we can get outside of this country. If the South is going to be exhausted in less than ten years, if we must go to the West inside of ten years, and if by that time ten years of the twenty-five years our virgin timber is likely to last will be gone, even if we do not increase the use of it, then we must consider what we can get outside of the United States.

Canada, if it should let us take all it had, it could give us only about the equivalent of twenty years of our own consumption. Of course, we are not going to get it all. The Canadians naturally will not put themselves in the situation in which we are for our benefit, and that is right enough, for we would do the same thing in their place. At the outside, the estimate of the lumbermen seems to be that we shall never get from Canada over ten or twelve per cent. of what we use.

When the South is exhausted the lumbermen figure there will be in the eastern part of the country a demand for ten to eleven billion feet which will have to be supplied from the Pacific Coast, moreover the recent raise in freight rates was equivalent to moving the western timber one thousand miles farther away from the eastern consumer than it was before. The more you think of the situation the worse it looks.

Mexico is already a considerable importer of wood. Estimates indicate that 50 to 70 per cent. of the total consumption of Mexico is now imported from the outside, and, mostly consists of our own southern pine. The Central American Republics have a good deal of timber, but it is practically unavailable for our use except possibly for railroad ties. If you take the three big timber countries of South America-Brazil, the Argentine, and Uraguay, you will find a very large excess of imports. Before the war it is said they were importing five-sevenths of all the lumber they used; it is doubtless now because the lumber production in South America was greatly speeded during the war. But still the fact to be reckoned with is that South America is an importer of lumber and not an exporter.

If you cross to the other side of the Atlantic, you find in Europe a situation curiously parallel with our own. In the United States fifteen of our States are still lumber exporters, although five of them will soon turn to be importing States. In Europe there are seven lumber exporting and fourteen lumber importing nations The only State in Europe that has timber of any considerable amount, as we count such things, is Russia. Sweden has 57 millions of acres of timber. Finland has nearly as much, Austria-Hungary a little less; Poland, Norway, and Rumania, each has a good deal less. Those seven States export timber, but the only considerable amount that can be had from any of them is from Russia. The other fourteen are importing States. The situation is such that all the lumber that can be purchased from any of them is needed and can be used in Europe. There is none for us. All the Mediterranean States must be practically reforested. Germany has been a timber-importing State since 1870, and France before that.

The result of it all is that so far as Canada, Mexico and South America are concerned, there is nothing much for us. The same is true of Europe and of Siberia. Africa woods are not suitable to our uses. Australia is a lumber-importing country, South Africa is a lumber-importing country, and in the southern hemisphere there is practically only Tasmania and New Zealand that are exporters to any extent.

When you figure it all out you can not escape the conclusion that unless we attend to this matter right here at home we shall be squarely up against a great timber shortage. Take the world as a whole; about one-quarter of the land surface is in forests. We have got about 24 per cent. of our surface in forest. 112,000,000 acres has some second growth on it; 133,000,000 acres of it is practically without second growth of any kind, and 81,000,000 acres is completely barren. That 81,000,000 acres is as large as the combined forests of Germany, Denmark, Belgium, Holland, France, Switzerland, Spain and Portugal.

Europe has a quarter of its area in productive forests. We have a quarter of our area in unproductive forests. Europe uses 150 board feet of wood per annum per capita. We use 300. Europe already has to import very largely. On the basis established by centuries of custom Europe is not able to supply a per capita consumption of 150 board feet.

So you see, when you get the thing all figured out, it is a perfectly real situation that confronts us. It is a perfectly definite knowledge that unless we take hold of this situation with both hands and do something about it our capacity to go on at all is at stake. I do not want to seem to use exaggerated or unjustifiable language, but so far men have never been able to get on without wood. Modern civilization is absolutely dependent upon wood.

We have come to a point in this State where, as the Governor said, it will be a very serious reflection upon us, if we do not look the facts squarely in the face and get ready to act about a situation which is more dangerous than any other single threat that confronts us. If you are willing to look beyond the next five or ten years, there is no other single fact that carries so large a threat and so real a threat to the industries, agriculture, and transportation of this State, as the fact that our own forests are exhausted, that the forests of the United States are on the verge of exhaustion, and that no adequate provision at all has been made to meet that situation.

In the United States at large we have 153,000,000 acres of national forests. That is one-fifth of the timber land of the United States. Well, four-fifths of the timber land in the United States is being exhausted more than four times as fast as it is being reproduced; so you cannot meet that situation by taking good care of one-fifth of it. Our lumber alone (disregarding wood used for other purposes) is being cut five and a half times faster than it is being reproduced And I want to make this point as squarely as I can—it isn't only a question of price; when we overlook that the fact remains we cannot do business at all without the wood.

I hope this conference all the way through may take into most careful consideration the question of what we are going to do when our present supplies are gone. We know they are going; we know that the scarcity of lumber which prevailed during the war has been relieved only for a short time and will come back, and we know you cannot do business without wood.

There are, it is true, many encouraging features in the situation. As Mr. McCaleb has said, the railroads have given this year such cooperation in the prevention of fires that has never been known in this State before. I doubt if there is any State in the Union where the railroads will do as well as they are doing in Pennsylvania to help prevent forest fires. There has been a larger recognition in this State this year than in any other State in the Union, but all of that is useless unless out of these efforts and out of this situation we get practical results.

You are the representatives of the industries of the State who need this wood, come together at the Governor's invitation to find out how we are going to get it. I hope that just so far as may be possible during the remaining hours of the session, that question will be kept in mind—how are we going to meet the dangers we know are ahead of us; how the railroads, the mines, the factories, the farms of this State are going to keep at work when this pinch actually gets to us.

I want to apologize for taking so much of your time, but I was keen to have a chance to say just that one word to you, to give you as far as I could an idea of what the Department of Forestry has been figuring on in this whole matter.

The fact of the matter is that never yet have substitutes reduced the quantity of wood used for any large classification of purposes. For instance, there is a great deal more wood used now in the United States for building than there was when every house in America was built of wood. There is more wood used in the shipbuilding industry now than when there was not a steel vessel in existence. You can't build a concrete house without wood, and not uncommonly it takes as much wood to build a concrete house as it does to build a frame house of the same size. Of course, there is a certain salvage. You cannot build anything of concrete as things stand now, without the use of wood.

So, while we have run in substitutes for one-sixth of the uses to which wood used to be put, nevertheless we have entirely failed to diminish the total consumption of wood. Our per capita consumption is dropping, but every time it drops you drop the standard of living. One of the most powerful reasons why we are short one million homes in this country today is because the cost of lumber is about thirty per cent. of the cost of a frame house, and the high cost of lumber has helped to stop people from building.

So then, you can come squarely up against the residual fact that you cannot conduct our type of civilization without a supply of wood, and that we face this practical certainty of shortage unless we take real action. We have land enough in Pennsylvania to grow substantially all the lumber of the common grades that we use. This State can produce as much as we are consuming now if it is properly taken in hand. We are cutting about one-fifth of the lumber we are consuming, but according to the best estimate we are only growing a third of what we are cutting.

We are in luck in Pennsylvania in this way that we do not have to plant on any large scale. There is very little forest land that won't reforest itself naturally if we give it a chance. The Pennsylvania Department of Forestry has been planting now for something like twenty years, and in that time has succeeded in replanting, out of the six million of acres of waste land in the State, about 23,000 acres—in twenty years. The thing is too big. That desert area of 80,000,000 acres in the United States is being added to every year at the rate of an area the size of the State of Connecticut at least. The devastation is clearly beyond the reach of any remedy by replanting. The only thing that will help us really in Pennsylvania is the prevention against forest fires. If we can keep the fires from burning out the new growth, then we can expect a supply within a reasonable time, and we are in great luck in that respect.

FIRST DAY—EVENING SESSION.

THE FOREST AND THE PRESS

by

E. J. STACKPOLE.

First, I want to congratulate Pennsylvania upon the splendid organization which it now has here for promoting the work of the reforestation of the State, and secondly, to personally compliment our Forest Commissioner on the tremendous work that he is doing and the splendid character of the undertaking which he has set out to accomplish. I was speaking a moment ago with a couple of our friends here tonight about the apparent indifference of so many thousands of Pennsylvanians to this important question. I believe, until it touches them personally in some way, that they will fail to co-operate as they should.

I am going to discuss for a little while one industry that has been vitally affected, that is the newspaper industry. Unless we have some way of replenishing the forests and increasing the wood supply we are not going to have newspapers in a few years, because no practical substitute has yet been found for wood pulp. You know what we have passed through in recent years. The cost of newsprint has gone up to such an extent as to put out of business hundreds of newspapers of all classes. Today the general policy of publishers is to amalgamate, merge and consolidate in order to reduce overhead expense and make it possible to continue in the industry. I do not pretend to have any solution for the difficulty, but scientific men under the direction of Mr. Pinchot are going down to the root, and it is our business as individuals and citizens of the State to give them our best support. Headway has been made in the last six months. I have talked with many people and there is a very general impression abroad that it is not alone Mr. Pinchot's job; it is the individual's job, and because of this fact we are headed in the right direction and substantial results must follow. I am going to present a few figures—not enough to make you tired—that are authoritative and which you can depend upon as being absolutely correct.

The relationship between the forest and the press is one of the most vital economic problems of today. This is truly a paper age, and even more truly a newspaper age, which is the same as saying that it is an age of wood.

To most readers a newspaper is a thing to be hastily scanned. Few men who run while they read stop to think what a close co-ordination of service from lumber-jack to newsboy is needed to produce a 2-cent and up-to-the-minute resume of the world's happenings in society, politics, industry, science, and education. Still less do they realize that the newspaper which he holds in his hand is a 100 per cent. product of the forest. Wood fibre is the only constituent of newsprint paper. This is why the forest problem touches so intimately every man, woman and child in the United States.

After all is said and done, the newsprint situation goes straight back to the woodpile; and the size of the available woodpile is now and will hereafter be the determining factor in the paper supply.

Few people know how large a pile of wood is used annually in the United States for the production of paper. Our annual consumption is now over 6 million cords. If stacked upon an acre this number of cords would make a solid pile 4 miles high. Government experts estimate that the consumption of pulpwood in the United States will reach 10,500,000 cords by 1930 and 16,000,000 cords by 1950.

I know of no way by which the real economic significance of the forest situation may be understood more clearly than by considering briefly the history and present condition of the paper, particularly, the newsprint situation.

Before 1850, cotton and linen rags, esparto grass, hemp, straw and other vegetable fibres were used in the manufacture of paper. It was not until 1840 that Keller patented his process in Germany for a woodpulp grinding machine. The process was not placed on a commercial basis until 1854, and it was introduced into the United States by Warner Miller as late as 1866.

The growth of the paper industry in America was prodigious. Within a half century it has developed from practically nothing to a total consumption of 2 million cords in 1900, and in 1920 the total consumption exceeded 6 milion cords, an increase of 200 per cent. in less than two decades. In 1880 the average person in the United States used about 30 pounds of paper per year. Today the average person uses 147 pounds per year.

We all know that the demand for newsprint has been increasing by leaps and bounds. In 1899 there were consumed 569,000 tons, while in 1918 our consumption had risen to 1,760,000 tons—an increase of about 200 per cent. In 1880 the average amount of newsprint consumed by each person in the United States was 3 pounds and in 1919 it was 33 pounds—an increase of 11 times in 40 years.

The first newspaper in America was published just 231 years ago. Today there are about 26,000 daily, weekly, and semi-weekly newspapers in the country. The daily papers alone have a circulation of more than 28 million copies. There are 60 dailies whose circulation exceeds 100,000 copies and one Sunday paper claims more than a million circulation. This rapid growth shows the increasing demand for pulpwood, and the enormous present drain upon our forest supplies.

The estimated value of the paper products derived from pulp is at present about $780,000,000, made up, according to the War Industries Board as follows:

KIND	VALUE
Newsprint paper	$136,000,000
Book paper	125,000,000
Paper board	156,000,000
Fine writing paper	142,000,000
Wrapping paper	89,000,000
Miscellaneous paper	132,000,000
Total,	$780,000,000

Moreover, it takes more than pulpwood to make paper. For paper production we use annually 9,200,000 tons of coal, 21,600,000 gallons of oil, 1,287,000 tons of chemicals. According to the United States Bureau of Census for 1909 the industry required a capital of $409,000,000, gave employment to 81,000 persons, and the manufactured products had an annual value of $267,000,000. Last year (1920) nearly 98 per cent. of the $800,000,000 worth of paper manufactured in this country was made wholly or in part of wood. We cannot get away from the bare fact that the wood pile is fundamental to the permanency of the paper industry.

Early records show that the first paper mill in this country was established in 1690 by William Rittenhouse near Philadelphia. Now there are about 250 mills in the country. Maine, New York, Wisconsin, and Pennsylvania are the leading States in pulp production in the order given. In these four States 66 per cent. of the entire output of the country is produced.

Pennsylvania ranks fourth in the production of wood pulp. In 1918 almost 200,000 tons of pulpwood were produced within the Keystone State. To produce this amount 383,699 cords of wood were required, which was 45,000 cords less than the amount used in 1916. The decrease in pulpwood production in Pennsylvania between 1916 and 1918 may be attributed largely to the rapid exhaustion of the supply of hemlock. In 1916, 64,993 cords of hemlock were used in the production of pulpwood, while in 1918 only 5,151 cords were available. There is only one explanation for the decrease, and, that is, the hemlock is practically all gone from the hills of Pennsylvania.

We are a nation of wood users and in order to continue our habits and maintain our industries we must become a nation of wood producers. I believe that few people have a clear conception of the enormous amount of wood that is used annually in the production of paper in Pennsylvania, or the amount of paper that is consumed by our citizens. The 383,699 cords if ranked end to end would make almost 6 full width cord rows extending from Harrisburg to Philadelphia. It is also fair to assume that the average citizen of Pennsylvania uses at least fully as much paper as the average person in the United States, which is 147 pounds per year. Upon this basis the total amount of paper consumed annually in Pennsylvania is at least 1,281,863,373 pounds.

All nations have gone through a crisis when their supplies of timber began to be inadequate for their needs, and only those which have solved the problem have prospered, while those which failed to solve it have become decadent. Witness Germany, France and Scandinavia on the one hand, and China, Syria, and Spain on the other.

A survey of the situation shows the urgent need of immediate and large scale efforts to provide a permanent supply of raw material for the pulp industry. The United States is at the parting of the way, and Canada is nearing the same point. Unless timber growing begins on a very large scale in the United States in the very near future, there will be a woeful shortage. Right now is the time to apply the remedy. Pennsylvania has 13 million acres of forest land, most of which will retain a forest cover for many years, for it is too rough and rocky for the plow, but if protected properly and handled carefully will yield enormous quantities of wood suitable for the manufacture of newsprint and other pulp products.

In the early days the pulp mills received all their supplies from near-by forests. When the local supplies became exhausted it was necessary only to reach out a little farther. Additional supplies were never far away. But this method of easy extension no longer obtains for the local supplies are now practically all exhausted and only distant supplies exist. The high transportation charges upon pulpwood supplies from distant places make them economically inaccessible. That the situation is real serious is shown by the action of the great pulp and paper companies of the Northeast and Canada. In 1908 the Laurentide Paper Company of Canada began planting forest trees and now it has a nursery covering 46 acres and is planting 1,000,000 trees per year, and plans to plant 5,000,000 by 1924. Other pulp and paper companies, among them the Roirdan, Abitibi and Spanish River, have established nurseries and are planting forest trees on an increasing scale year after year. These hard-headed business men realize clearly that a continuous supply of pulpwood is the one means by which their manufacturing establishments can be kept alive.

There appears to be little hope of relieving our newsprint and other paper shortage by possible increase of importation from aboard. And any foreign source of supplies is a palliative rather than a cure. There is only one worth while cure and that is to grow our wood at home. And there is no better place to grow it than on the hillsides and mountains of Pennsylvania. There is only one crop which they can grow successfully, and that is wood. We need the wood, and to permit them to remain in their present barren and unproductive condition is an economic crime.

I cannot help thinking of my experiences as a boy in the Juniata Valley. It was customary for chaps of my age to cross over the mountains into the Licking Creek Valley, a great forest district at the time, with wonderful sawmills turning out tremendous quantities of lumber. All through that section saw mills were as frequent as farm houses, producing enormous quantities of lumber. All that has disappeared. Today, those ridges that were covered by fine timber are now barren wastes except for underbrush and here and there a small growth of trees. Of course, the forest fires have devastated all that region time after time, but Commissioner Pinchot, realizing the real need of the situation is asking the Legislature for an appropriation, and the Legislature will be woefully deficient in its duty if it does not provide the means to stop these fires and give us a chance to get back that which belongs to us by right of heritage.

Mr. PINCHOT: I might say, with Mr. Stackpole's permission, that there is about to ensue a very considerable development of pulp in Alaska. There are enormous quantities of pulpwood there, and smaller quantities in Washington and Oregon, but the great question is the transportation charge. The last figure that I have was a rate given by the Alaska Steamship Company and the Pacific Steamship Company, the two affiliated companies that have a monopoly of water transportation from Alaska down to Seattle, of $9.00 a ton for wet pulp, which amounted to something like $22.00 a ton for dry pulp; in other words, the transportation monopoly was standing squarely in the way of developing the pulp resources in Alaska and therefore of the relief of the situtation all over the United States. The answer is production here at home, and nothing else.

THE FOREST AND THE FARM.

by

JOHN A. McSPARRAN

Mr. Chairman and Ladies and Gentlemen: I would say that no credit is due to the Pennsylvania State Grange, or to any officer of the Pennsylvania State Grange, for having taken up this proposition. It was because we had in our membership a man who had given his life to the study of these matters, and his recommendations came before us with the absolute confidence of our membership, and therefore, because of what he had done in a national way, we felt that Pennsylvania would be missing a great opportunity not to take advantage of his eminent ability and service in this direction; and it was because of that confidence rather than any forsightedness on our part that the Pennsylvania State Grange was able to be a pioneer in this work.

I have been asked to speak a few minutes upon "The Forest and the Farm". I suppose there is no part of the agricultural proposition that is as little appreciated by the average farmer as the woodlot, or the forest as it is known, in connection with the farm. It is a sort of a side issue that has always been called upon to render an efficient service to the welfare of the family, and yet which has never been recognized as an asset in the agricultural proposition; and I believe that the time is more than here when it should be recognized as a real asset to agriculture.

The farm is very greatly dependent upon its woodlots because it is the source of at least the emergency supply of fuel. Whatever may be the habit of the farmers in regard to their fuel,if they have a woodlot they always count on going back there to furnish the fuel for the family. And then it is the place where the farmer goes to get the stick of timber that he needs in his repair work. It is the place to which he goes for the bunch of boards, or anything of that kind, by taking the logs to the mill, that he needs for repairs on his farm. But as to the development of his forestry as a commercial proposition, or as a field upon the farm that should receive the same kind of care in handling as the other fields on the farm receive, it is practically a neglected proposition. And there are bad practices that have come up because of that lack of appreciation of what that means to the welfare of the proposition of agriculture upon that particular farm.

I think it is the general custom for the farmer, when he wants a log, to go out into the woods and take the finest log that he can find, because of the fact that it will cut to better advantage, it will load easier, and it will answer his purpose a little better than possibly some other tree that would have been much better cut than standing. I have seen lots of woodlots on the farm where trees were allowed to go away beyond the age of proper harvest, simply because there were other trees in the woods that would split easier or would work up better, and the tree with the big burly knots on it was allowed to stand until it became an eye-sore and became practically unavailable for any purpose except wood, and in some cases actually rot down and be allowed to go to waste, and then the trees that should be taken care of were used for the purposes that that one should long ago have been used for.

I think one of the reasons why forestry should be maintained upon the farm arises out of the thought that is not generally recognized. Those of us who have lived in parts of the country where the woodland is nearly all gone have recognized that the water table is gradually receding; wells have to be deepened, springs that at one time flowed the year round, only flow intermittently, and it is in connection with the closeby piece of woodland where we can get the springs that run the year round. The wood seems to act as a sort of a sponge and the leaf mould upon the ground maintains a more even flow of moisture into the springs and water courses, so that it does act as a tremendous conserver of moisture and a tremendous conserver of the streams that are such a blessing to any agricultural community, and if it were for nothing else, to provide the means by which our cattle can be properly watered, and when there is added to it this great necessity that practically every branch of life has for this material, it becomes a double reason for maintaining these pieces of woodland.

There is another practice that is maintained, I think, in the average farmer's woodlot that ought to be corrected by educational propaganda from such a department as we have in forestry in the State of Pennsylvania, and that is to use the woodlot as it becomes ripe; to recognize it as having a period when it should be used, and to use these trees when they reach that period of maturity. I have seen pieces of woodland where they would simply go out to any part and cut the trees they wanted with no reference whatsoever to the growth that would come from that stumpage, and where a woods is picked over that way and used, with holes punctured in the leafy roof, after a few years of that kind of handling, or possibly a generation of that kind of handling, there is scarcely a straight stick of timber in the woods. But where they begin at one side, or near one corner, and take the lumber as they come to it, making the tree serve their purpose if it does not naturally do so, and adjusting their needs and their ways of cutting the timber to the necessities of the forest, then that piece of timber will grow up in straight sprouts and you will have a valuable second crop on what otherwise would be too crooked.

We are only begining to realize how wonderfully valuable woodland is, and how much can be taken off of it if it is properly cared for and properly handled. In our woodlot at home, on a Lancaster County farm, we have a piece of ten acres that have been very highly productive and is today yielding splendid values in wood and in lumber. Possibly twenty-five years ago there were 160 telegraph poles, some of them seventy feet long, and none of them less than thirty-five feet and seven or eight inches at the top, indicating that there were 160 chestnut trees, all very considerable trees, there at that time. About sixteen years ago there was taken out of that piece of woodland some ten to twenty thousand feet of long lumber for a barn frame; timber running thirty-six to fifty feet long that could not be gotten in another lot of timber in which a saw mill was put for that purpose. About eight years ago there was a complete barn frame taken out of that piece of timber aggregating about 65,000 feet of lumber, and about three years ago there was 48,000 feet taken, the balance of the chestnut, all of which now is gone because of the blight, which is furnishing one of the very serious problems upon Pennsylvania farms.

There is no wood that grows that yields itself to so many needs of agriculture as the chestnut wood. It grows rapidly, it stands the weather well, it is good for weather boarding, comparatively good for posts, although the well-to-do farmer has grown locust for his posts as a rule; but still the chestnut will stand in the ground quite a while and the fact that it is blighted, and there apparently is no let up in the hold that the blight has upon the chestnut woods, leads to the thought that there will possibly be, not for the next fifty years, any considerable chestnut in Pennsylvania. I suppose Nature will finally evolve a species of chestnut that will withstand the blight and then from that species of chestnut will be propogated a woodland of chestnut timber; but that will take half a century or more because we find that even the little sprouts of chestnut that are shooting up are almost in every case attacked by the blight. Then this last year there was taken off of that ten acres about 70,000 feet of lumber. That indicates just what a little piece of woodland, if it is properly cared for, will do, and there is yet on that woodland everything from ten inches down. Nothing was cut that would not make at least two or three railroad ties.

I want to call your attention to a thing that is being done in a great many lumbering operations that is very highly destructive, and that I think, I know, in fact, from the experience of having lumbered several times on our own properties and handling our own trees, what can be done in that respect. It is impossible, of course, when you fell a large tree in a forest, to prevent breaking down of the young material that may have come up around that tree from former stumpage; but if the wood men are told and instructed and there is care taken, that immediately they cut down a tree they relieve every and all young material that is broken down by the top of that tree, it is surprising how very much timber can be left on an acre and every stick of any value taken off that acre. You see some lumbermen when they go into a woods that will ruthlessly slaughter little trees one, two and three inches in diameter and practically nothing is left on the ground.

You have a condition after that kind of lumbering where the wind can blow away the leaves and can make the land bare and make it in a condition where it will not as readily respond to a second growth. But if these little trees are maintained, then you immediately have a shade over that land and you immediately have a windbreak that prevents the taking away of the leaf-mould and those things from the ground, a condition that you want for the growing of a second crop of timber. If there was a propaganda over the State of Pennsylvania to do away with the thought that it is a duty to leave a piece of wood-land just about as horribly mutilated as possible rather than to leave every possible tree standing upon the soil, this would help.

There is another proposition that I have found in connection with the manufacturing of lumber, and that is that our manufacturers insist upon lumber of long length. I have repeatedly in trying to sell our own lumber, when I would tell them what length it was, and say some are eight feet long they would raise an awful howl because anybody had timber for sale eight feet long. They would say, "We want sixteen-foot-long lumber". Of course, they do, and as long as they have a forest in Washington to draw upon they can get the great bulk of it sixteen foot long; but the trees in Pennsylvania that we have to depend upon from now on do not grow very much sixteen-foot lumber, and a man is a fool to try and get sixteen-foot lumber out of crooked trees because you can't get it that way.

Our manufacturers, instead of depreciating the shorter lumber, ought to carefully work out what is the actual per centage of waste and then encourage the Pennsylvania tree owner to develop his forest so that it will produce the very best possible, The time has come when we can not select just the things that we like out of the trees and leave the rest go. I have a brother living in Puget Sound that I have been to see several times, and he has a piece of land there upon Bainbridge Island, and right opposite him is forty acres of land that was timbered off some years ago. I have not the slightest doubt in the assertion that I could have walked across the whole forty acres of land and without setting foot on the ground—simply jumping from log to log—left there, simply because the grain ran around the tree a little bit or something of that kind; logs that were absolutely allowed to go to pieces and to rot on the ground.

You can readily understand that we are past the day of that kind of lumbering. Unless our manufacturers will meet the producer of lumber half way and encourage him to go clean up into the very top of the tree and save everything that is worth saving, you can readily understand that we will not rapidly turn the tide from a losing proposition to a period of self-sustenance from a wood standpoint.

I also find this that the average Pennsylvania manufacturer cares nothing about Pennsylvania timber. I have had the finest kind of oak that we can grow in our country, 40,000 feet of it stacked up, and have lost several sales of that lumber because he said, as a manufacturer, that the West Virginia lumber was a little easier to manufacture and he would not bother with Pennsylvania lumber. You can readily understand that there is not very much encouragement to a Pennsylvanian to keep his lands in timber if he is to be given to understand by those who are manufacturing that timber into commodities that it is capable of being made into, if they will persist that they prefer other timber to Pennsylvania timber; but if our manufacturers would appreciate that fact and try to meet the producers half way, and try to give him the value for his lumber that it is worth, there would be much more inducement to conserve the lumber in Pennsylvania, to grow it and to scientifically put it upon the market; and that encouragement would go a long way toward turning the tide in this serious situation that we face.

It is not going to be long until we will be dependent upon the second growth, upon the scientific development of timber, when we will go out into our own woodlands and cut out the things that are not valuable. There is only one way to encourage the farmer to do that and that is to give him to understand that the lumber he does grow will be appreciated. We can grow pulpwood very readily in Pennsylvania because the white poplar, which is a good paper wood will grow very rapidly; it grows almost straight and it can be grown very thick on the ground, so that we are not by any means handicapped, in fact we are greatly blessed in Pennsylvania in having a wide variety of growth, in having a wide variety of things that are suitable to Pennsylvania's needs that will grow quickly and well in Pennsylvania; and therefore it ought to be the policy of the farmer and the manufacturer in Pennsylvania to work together for just as large an out-put as we can possibly make our acres produce.

Mr. PINCHOT: You can't grow food without wood. The farms of the United States consume 35% of all the lumber used in this country, a little more than 50% of all the wood of every kind. Our people could not be fed without it on the present basis of the American standard of living, so that while we use wood in many respects and are accustomed to using it, we are not in the habit of thinking that we eat wood. But we do, in a manner of speaking, eat up one half the wood produced in America every year.

THE FOREST AND THE HOUSEKEEPER

by

MRS. GEORGE W. DIBERT.

Mr. Chairman and Gentlemen: The question of reforestation is one with which every one in the state should be familiar, particularly the housewife, but it seems to me that the attitude of the mass of people toward this problem is similar to that of the old colored man in the South who went to a white trader to borrow money to buy a mule and supplies to tide him over until he could grow a crop of cotton, it being understood that the loan was to be repaid when the cotton crop was harvested. His mule died and his cotton crop was a failure. He went to the white trader and told him what had happened. He said "Now, Boss, the mule's dun died, and the cotton crop's dun failed" and like most happy-go-lucky negroes did not seem to be worried or show much regret. The white trader was provoked and said, "Well, you don't seem to be worried much about it." "Land sake's Boss ain't it enough that you's worried, ain't one man worrying enough?"

It seems to me that many of the people in the State think it sufficient that Mr. Pinchot is worried about the wood shortage, why should they worry?

As I said before every one in the State should be familiar with the wood situation in the State, because there is no phase of the question that does not affect the home, the housewife and her family. And the housewife should be more interested than she is, in fact she should be vitally interested in it because of its direct influence on life itself.

I wonder how many housewives in the State have ever stopped to realize how closely linked is their every-day life, the comfort and happiness of themselves and their families, even their very existence, to the preservation of the forests.

Without timberland and forests all life would soon cease to exist, because the air we breathe, the water we drink, the food we eat, is directly affected by the forests or lack of forests. Every article that enters the home, food, clothing, furnishings cannot be produced or manufactured without the question of wood in some form or other entering into its production or manufacture.

Some one said to me recently "Why are you trying to get endorsements for the forestry program, why are you interested"? After giving my reasons for my activity I received this reply: "Well, I am glad I asked you that question because I shall do what I can in the future to promote interest in reforestation and in Mr. Pinchot's program." Some nine years ago I spent a summer in the State of Oregon, and of course you all know something about their wonderful natural forests and the beautiful red fir lumber that is shipped from there to almost every country in the world. Since that time I have been more or less interested in the subject of reforestation. Many times I stood on the banks of the Williammette River and watched the boats come in from practically every port in the world, and take to Foreign Countries some of the finest lumber that the United States can produce, or that can be produced by any country, to foreign ports. I wondered many times while I was there what would be the result to the people of the United States. Could not help but think here we are sending all this beautiful lumber to foreign countries when it should be conserved for home use.

I realized at that time that the supply in Pennsylvania was inadequate to meet the demand, and I also realized that in just a few years Washington and Oregon, despite their great natural forests, would face the same situation that we in this State were facing. When the supply in the West becomes exhausted, which will be within a very few years, what are the wood users in the U. S. to do, where are they to get their supply, because up to this time nothing has been invented to take the place of wood?

A century ago, yes even a half century ago, the question of reforestation was not so important as it is today. And yet if the people of this State had considered it of more importance at that time, and had legislated accordingly, the question would not be such an acute one today.

We had great wealth in the original forests of this State, but today we face a situation so acute as to be felt by every manufacturing concern in the State. The shortage of wood affects food production, coal and steel production, and to a very large extent our whole transportation system. Of course we all know that when any of our industries are affected or hindered in the slightest degree in the manufacture of their products the cost of production advances, and then the housewife is directly affected. I said before that shortage of wood products, possibly affects the housewife more than the man of the household because ultimately the housewife pays the cost. Of course the man produces, he earns the money to keep up the home, but I am going to make this statement without fear of successful contradiction, that, while he earns the money, in 99 out of every 100 cases the wife saves it and pays the bills.

Take the question of food production alone and its relation to the forestry question. During the last three or four years I have heard many speakers discuss the question of increased food production, but I have yet to hear one say anything about the importance of wood conservation and its relation to increased food production. We know that without forests food production could not be continued. The forests and timberlands serve as a protection from floods, storm and wind, and also as a protection for bird and animal life, which kill and destroy the pests, bugs, worms, caterpillars, etc., that destroy crops. The birds alone save to the housewives of the State several million dollars a year by the pests they destroy.

Do you realize what would happen if we had no birds, that in a short time food production would cease. Now we even appreciate the once despised English sparrow, because we do know that they eat bugs and worms. One season at my own home we had so many caterpillars, millions of them, or so it seemed to me, and I watched the sparrows with the other birds native to my part of the State, eat them. They seemed to work just as industriously as any of the other birds. To be sure they became quite saucy at times and wanted to boss the place, but the blackbirds, robins, and blue birds were a match for them.

In many sections of the State, in fact in practically all of the farming sections you will find a farmer here and there who understands what protection of bird life means to his food production, and they are planting trees for the conservation of bird life. I will admit that some of them are not doing it because they love birds so much but because of the economic value of having birds on their farms.

I have spoken of the value of forestry in food production. I am now going to ask you to follow the thread of my thought as I try to explain some of the uses of wood and its products. You will agree with me that it enters into practically every human activity from the time of birth until we are laid away in our last resting place; food affects our lives from the cradle to the grave. Take the home itself; Pennsylvania has more home owners today than any other State in the Union, over 700,000 in the State of Pennsylvania living under their own roofs. This was made possible by the good and cheap building material we had right here at home. The original forests of Pennsylvania contained some of the best white pine to be found in the world, and it was this wood that made possible the building operations that made so many homes comfortable and happy. Most of the housekeepers of Pennsylvania live in wooden houses and many of them are covered with a wooden roof. Millions of shingles are made annually in Pennsylvania in spite of the many substitute roofing materials now in use.

It has occurred to me frequently that the great shortage of houses in the State is due, not to the high cost of labor, but to the shortage of lumber in the State. We can pay the increased cost of labor, but certainly can not pay the transportation charge in addition to the price we must pay for lumber we purchase in States bordering on the Pacific Coast.

What is the solution? Does the shortage of houses, the high cost of building material affect the men of the State alone or does it affect the housewife also?

Take the furnishings of the home—and we find that everything entering the home is affected almost directly by the supply of wood used in its production wholly or in part. While Pennsylvania does not rank among the leading States in the manufacture of furniture,

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yet this industry is one of the oldest in the State and includes in its products the highest grade of furniture. The manufacture of furniture is the fourth largest wood-using industry in the United States. When we speak of the great amount of lumber used in the manufacture of furniture I wonder how many of us think of the musical instruments in connection with furniture and the immense quantities of lumber used in their manufacture alone. Take the Victrola and Graphonola and the millions of feet of lumber used in their manufacture, and they are only two of the hundred or more makes of talking machines or music boxes on the market. Every instrument is made, or rather the casing is made of wood, and in addition every instrument is packed for shipment in a separate box made of wood. This applies to pianos and organs as well. Millions of feet of lumber are used annually in making the boxes for shipment of these instruments. If you think for a minute you can have some idea of the amount of wood used for this purpose alone. Who pays the cost of the box in which the musical instrument is shipped, because it certainly is added to the cost of the instrument? Why the housewife in the end pays it of course.

We ordinarily would not think that wood entered into the manufacture of the shoes we wear, and yet the life of the steer that produced the hide from which our shoes are made is closely related to forestry whether it be grain or range fed, from the time it is born until it reaches the stockyards and is butchered. The hide is then tanned from bark stripped from hemlock logs cut from trees grown in our forests. It is then sent to the factory in wooden cars hauled over rails laid on wooden ties, manufactured into shoes, packed in wooden boxes, shipped in wooden cars again hauled over rails laid on wooden ties, hauled from freight station in a wagon or truck the body of which is made of wood, placed on shelves made of wood sold over counter made of wood and wrapped in paper made out of woodpulp.

Just the same with our clothing—wood enters into the very life of the sheep that produces the wool from which most of our clothing is made. Also the furnishings of our homes from the furniture, piano, and Victrola to the draperies, carpets, blinds, wall paper, kitchen cabinet, yes the kitchen range and the coal that is burned in the range—all are closely allied with the question of forestry. The books we like to read, our magazines and our daily paper. You have heard this evening about the paper shortage. Do you realize what a calamity it would be if we could not receive our daily newspaper? To think that we might be compelled, through the lack of woodpulp, to go back to the days of no, or scarcely any, newspapers and magazines is unthinkable.

I have mentioned a few of the uses of wood and wood products that affect the housewife and her family, but let us think of a few more. Take coal for instance—the cost of producing coal has increased almost 60 per cent. during the last few years, and not the least item to add to that cost is the increased cost of mine props, due in great measure, to the supply in the State not meeting the demand, therefore adding the cost of transportation to the cost of the props. Take our transportation, freight and passenger, affected by shortage of wood. As yet no satisfactory substitute has been found to take the place of wood ties.

Now I am going to speak of one phase of this question that no doubt will surprise you, and that is the political phase of it—and yet it should not surprise you since Tennessee ratified the Suffrage Amendment and thereby making equal suffrage a part of the U. S. Constitution.

You ask what effect does politics have on reforestation? Well may I ask, "what effect does politics have on everything and how is everything affected by politics. During my suffrage campaigning I learned that politics entered in great measure, into many of the things that affect our home lives and since that time, particularly through the things I have learned here in Harrisburg, lobbying for the various Bills in which I am interested, I am almost convinced that politics enters into practically every question of home life and human living, or at least to add to the comfort, happiness and health of human living. What relation does forestry have to politics and what relation does politics have to the housewife? That it is not a question for one man, nor for a group of men, nor for all the men of the State to handle; but it is a question for the women in the State as well as the men to help handle. Why? Because now the women of the State help to elect the men who must make the appropriation to carry out the forest program of Mr. Pinchot, and I want to say for the housewives of the State that the question of wood shortage in the State of Pennsylvania affects them ultimately just as much, if not more, than it does Mr. Pinchot, Governor Sproul, or any or all the men in the State.

I would not be so interested in the subject of reforestation as I am today were it not that the District Forester for our District has an office adjoining ours, between which the communicating room is always open. His small room is so crowded that he has my sympathy from the time he comes to the office in the morning until he leaves. He has the use of our office always when I am not there, and I am very glad indeed to let him use the office because if I did not, many times the people who come to consult him would be compelled to stand in the hall, as his own office is too small to hold more than two people at a time in addition to himself and his stenographer. There have been so many forest fires in our section of the State recently that our Forester has been working day and night. Several times he has come in the office during the day and has said that he was out fighting fires all night and must return at once. He had something like fourteen fires in one day. I want to say to you gentlemen that our District Forester is working hard and making many sacrifices by remaining in the forest service. His wage is a meagre one. I am fairly familiar with the business activities in my county, and I happen to know that our Forester could draw elsewhere twice the salary he is getting from the State and not work half as hard as he is working today. It happened to be my ill fortune to be in the office one day last week when we seemed to be surrounded by forest fires, and the telephone rang incessantly. Reports of fires came in not only from our own country but from districts in the adjoining counties. Now I want to ask you gentlemen—does politics enter into that man's wages? It most certainly does. Are we going to permit that man and others like him who are in the service, to sacrifice their own interests, the interests of their families, by continuing to pay them a salary much less than a day laborer gets, or shall we pay them a more decent wage, or at least a wage that is in some measure commensurate to the service they are rendering to us and to the State?

That man has children to educate; naturally he is looking forward to giving them a college education. How can he when we are paying him barely enough to make ends meet. He loves his work, is deeply interested in it, otherwise he would not continue in the work. He said to me recently, "Mrs. Dibert I realize I am a fool to continue in the forest service when I could earn more elsewhere, and put something by for the education of my sons." Are we willing to shoulder our responsibility in regard to the program as outlined by Mr. Pinchot and help make it possible for him to retain men like the one I speak of in the service or are we not? I would like to ask Mr. Pinchot to enlist every woman in the State if possible, and have them make it so miserable for the Appropriations Committee that they would be glad to make the appropriation, if for no other reason than to have peace from the importunities of the women.

We heard something in Governor Sproul's opening address today about the Administration being accused of extravagance. I have talked to many people, and also to quite a few Members of the House on my several trips here during this session of the Legislature, but I have yet to hear any one mention the word extravagance in regard to the forest program. The men seem to feel that it must be put over. Many of us do feel that in the face of the wave of reduction of wages throughout the United States, that it is extravagance on the part of the Legislature to increase salaries of men who are already drawing very large salaries, but not for the men in the Forestry Department because they are drawing practically starvation wages in comparison to the men who have had their increase, making their salaries from $15,000 to $17,000 a year.

I am going to ask the one lady in the house that I can see—and I am glad there are two of us here—to spread the propaganda of reforestation and forest protection among her friends, her club women, and to ask the Representative from her District to support Mr. Pinchot in his forestry program. I consider the best piece of work done by Governor Sproul since he took his oath of office was to draft Mr. Pinchot into this service. We need him. It has been said here that he could not be kept out, but men like Mr. Pinchot can enter many, many fields of activity. He is only in this work because it is next to his heart and because he realizes what it means to the people of the State to have him in it.

I have touched upon but a few of the wood uses, there are dozens and dozens more, but the question now is—what is the solution to the serious shortage we face today? Buy from other States? No, we cannot import from other States because their supply is decreasing rapidly, many of them already face a more serious shortage than we do in Pennsylvania. The only solution that I can see is to grow at home, save to the taxpayers the millions of dollars that we are now paying for the freight alone, and better still, plan for those who are to follow after us.

Gentlemen, please make it your business when you go home to talk to your wives, mothers and sweethearts about this matter, asking them to bring it to the attention of their clubs; have resolutions passed endorsing Mr. Pinchot's program and send copies of the resolutions to the Appropriations Committee, Governor Sproul, State Senator Crow and others.

Mr. PINCHOT: There is the question of packages. Nearly all packages in which things are shipped anywhere are made of wood—either wood or some manufactured form of wood. According to the figures of Professor Illick one-fifth of the lumber used in the United States goes into packing. It takes a fifth of the total lumber cut of our forests to distribute our cans of peas and shoes and all other commodities,—takes one-fifth of the complete lumber production of the forests of this country to get them to us.

One of the things that has been digging into my head is the fact that it is not the people who live in the woods that need the woods the most; it is the people who live farthest away from them; in other words, it takes more wood per capita to feed a man in town than it takes to feed him on the farm. The farther a person is away from the forest the more absolutely essential the forest is to that particular person.

When the invitations went out from the Governor for this conference there were a good many replies from different manufacturers saying they did not use wood in their business and they were not interested--linen manufacturers, lace manufacturers, ribbon manufacturers, and so on. These letters were sent up to me until finally the thing got under my skin. I wrote back to these gentlemen that there was not a saw-mill man in this country that was more directly dependent upon the forest than every one of them, and it is true. There is not a lace maker in Pennsylvania, or a sugar manufacturer, or an iron man, or anybody else that can handle his business without the forest; nothing that he uses can be produced without the forest. It is absolutely essential from every point of view all along the line, and I want to make that clear.

One-fifth of all the lumber cut is used in packages. It is an amazing figure. I did not believe it. I referred the matter to Professor Illick, and after a thorough looking up he finally came to the conclusion that the figures were correct.

SECOND DAY—MORNING SESSION.

April 14, 1921.

Mr. PINCHOT: With your permission, I will call the meeting to order. Under Mr. Clark's resolution I am directed to state the forest situation in Pennsylvania so far as I know it. Of course, there isn't any single remedy for a matter so widespread and of such long standing as the deficiency of forest products in Pennsylvania, but there are two lines of remedies without both of which we can not hope to succeed. One is as to what we can do inside of the boundaries of our own State, and the other is what we can do outside of our own State—in the other states of the nation and the rest of the world.

As to the situation in Pennsylvania: All the economies we can make, essential as they are, will fail to give us the indispensable result unless we can get our production back on a reasonable basis. We have land enough in the State, valuable for nothing but forests to grow practically everything that we need. Now the restoration of timber production in Pennsylvania means a number of different things—three main things have to be obtained. The first of them is the stopping of the fires. We know how that can be done; it is simply a question of money to do it. There is comparatively little land in Pennsylvania now devastated that will not reproduce itself if given a chance. There will have to be some planting, but to plant five million acres of devastated forest in Pennsylvania is beyond our power. It would cost us $15.00 an acre at a minimum, and five times fifteen is more million dollars than we can possibly hope to get for any such purpose, especially as the money can be used in so many better ways.

Fire prevention in a forest is precisely the same sort of a task as it is in a town. The getting of men quickly to the scene after the fire has started is the essential thing. I have some very interesting figures showing the result of getting your organization for fighting fires upon the scene; they show that if your men are slow getting there, there is a very large number of acres devastated per fire. In 1913 when the figures first began to be kept, the average number of acres burned over per fire was 410. Two years later it dropped to 300; in 1918, it had dropped to 134; then in 1920 it went up to 160 acres per fire. Last fall, after we had had a chance to reorganize this Department to some extent, the number of acres per fire dropped to eighty-seven—100 acres less than the year before, and this spring, based on 460 fires which have already been completely reported, the average has dropped to 48 acres per fire. We may be able to hold it down to that, and again we may not.

An interesting thing, is that taking the last five years as a standard you find on the average that about 50 fires have done half of all the damage. There were 1,600 fires in Pennsylvania last year; 50 of those burned 125,000 acres or half of all the acreage that was burned. The moral of that is, that you must get to the fire quick, and the proof that this is valuable is in the 48 average acres of the fires so far recorded this year. We know that this is so; you can stop fires, you can control fires, if you make your organization reasonably effective.

The first thing then to restore Pennsylvania forest production is to prevent fire, and for that purpose we have asked one million dollars from the Legislature, that being an increase from $90,000.00 in the present appropriation. Ninety thousand dollars is a ridiculous sum to be applied to a damage which amounts to a tax on the State of Pennsylvania (in its embargo on production) of $100,000,000.00 a year. We are asking 1% of the annual damage as an appropriation for the two-year period, which to say the least is not an extravagant request.

One thing we want to spend the money for is for more fire towers. The necessary thing in order to get men to a fire quick is to find out where it is quick, and the best method is the fire tower with watchman and telephone. We have fifty-two towers now; we ought to have two hundred and fifty.

We have three or four thousand miles of telephone line; we ought to make it very much more than double. We are short on tools; we are short on men; we are short on trails and roads especially. It was very interesting to note, during this spring fire season, that the size of the fires is found to vary almost exactly with the accessibility of the region in which they occur. If you have trails and roads and telephones and watch towers you can get men to fires quickly and keep the size down. So that what we want this million dollars for is not merely to fight fires; it is to equip the State, equip the Department, so that it can both prevent and fight fires effectively.

The first item of the remedy then is the stopping of forest fires. The second item of the remedy is the acquisition of this Pennsylvania Desert, over 5,000,000 acres doing nothing. The Governor's policy contemplates the acquisition of that land by the State. The State can buy it at the outside for a quarter of the annual loss. The Governor told us that we spent twenty-five million dollars and a good deal more every year for freight on lumber shipped into Pennsylvania, and a good deal more than fifty million dollars a year for the lumber grown outside of the State, and on top of that there is the flat loss to our industries, making up at least one hundred million dollars a year. For a quarter of that one hundred million dollars we can buy these five million acres and set them to work.

First, fire prevention; second, the acquisition of the idle forest land. The reason why is that all the history of forestry shows that the only kind of land in the world that is safe, is land either owned by the State or land over which the State exercises its power to prevent devastation. In Pennsylvania the situation is such that the natural thing to do is to acquire the land, I have asked for five million dollars from this Legislature for that purpose. I know we won't get the whole of it, but every dollar that we can get will be valuable. We can buy very large tracts of land now for $2.00 to $2.50 an acre. The thing will act with us just exactly as it did with the nation in the purchase of the Appalachian Forest—the sooner we can buy this land, the less it will cost the State. And then you will have an investment which will be enormously remunerative. The State lands we have bought so far has cost us $2.27 an acre. If you add up what was spent for it and all that was spent on it since it has been in State hands, you find that there is a net profit to the State in addition to the value of the production, in addition to the protection, in addition to the insurance against a famine of wood products, a net profit to the State of somewhere between four and five million dollars. The acquisition of forest land by the State pays.

So, first, fire prevention, then acquisition—the two remedies inside of the State; and third, and this third item refers to all the lands that are not now in State hands or are not to be in State hands—such a reorganization of the Department of Forestry and such funds as will enable it to take up with the private owners of timber lands throughout the State the things that need to be done to help them. You can not do anything with forestry unless you have got a public seentiment that will give you the necessary support. You can not have the public sentiment without an organization in the State that will keep the people of the State aware of what is going on and that will ensure co-operation and assistance.

We are asking this year for the running expenses of the Department $865,000.00, which is an increase of $192,000.00 over the present appropriation. That, of course, is less than the proportionate increase of new work that we have to do; the new purchase plan has to be looked after; a larger area of land is being patrolled; for the first time the whole State has been divided into districts and is being covered. We are doing a great deal more work than the comparative increase in the appropriation. This money will be spent for the twenty-six district foresters who have charge of this land, for the 2,200 fire wardens who are paid only when they work and who are scattered over Pennsylvania; for patrol; for co-operation and advice to private owners.

Another part of our work is research, the results of which are constantly coming out at this meeting. Then there is the tree planting work. We have an arrangement now with a dozen of the State institutions under which they will raise, with their labor, under our supervision, something like 20,000,000 trees a year, to be given away to individuals and companies in this State for planting. Some of these days that will be raised to 40,000,000 a year against the two or three million that are now available.

These are our activities—the maintenance of an organization, capable of putting over the work in the field, public education, the management of the State forests, and the improvement of privately owned forests in the State; fire prevention, acquisition, the maintenance of a real Department of Forestry. I ought to say, and I am very glad to say, because Mr. Gordon, Secretary of the Game Commission, is here, that this Department has had the most admirable co-operation from all the other departments under Governor Sproul. We have had his support, the support of the Game Commission, the Fish Commission, the Highway Department, and all the other departments of the State Government. We have not only had that, but we have had such co-operation from the railroads, from the coal companies, from the Boy Scouts, as has never been given before. It is a new thing.

The Boy Scouts have taken this question of forest fires up in a way that on the whole it is the best single thing that has happened to me since I have been Commissioner. We have ask them to become forest guides. Each forest guide signs a pledge that he will protect all forest life and try to get other people to do the same, and prevent and extinguish forest fires. Out of the 23,000 Boy Scouts in Pennsylvania, about 10,000 have already signed that forest guide pledge, and there is scarcely a day passes during the fire season when a Scout Master with his Troop does not go out to fight forest fires. In Indiana County 100% of the Boy Scouts are forest guides.

All of which is merely to say that there is a system now ready to go ahead with this work, that public interest is aroused as never before, that we have an organization that is capable of carrying the work on, and that the only thing we need for fire prevention, acquisition, co-operation and the executive management of the whole thing is money enough from this Legislature.

That is a general outline of the situation in which we stand, and one reason why I am exceedingly anxious to have that money this year is the fact that the State is trained for it. The prize fighter who is trained to the minute, and then doesn't make his fight, has to wait and go back from the beginning. If we lose this chance it will take us two years, it will take us more than two years to get back where we are now.

It is going to be many years before Pennsylvania is able to produce anywhere near enough wood to meet the demands of her people for timber. What are we going to do in the meantime? It does not make any difference how good the investment in this land is - I hesitate to tell you what the probable cash return would be from 5,000,000 acres if we assume that the annual product is at the rate of a cord of wood, per acre. We will skip that—it sounds like a fairy story; at a one hundred year rotation it is nearly $50,000,000 a year. Apart from that, we Pennsylvanians have got to do something to bridge over the gap between the time when our own forests will begin to supply us and the time when the South will be exhausted.

Take New England for example; 50% of her lumber consumption is imported; today New England has one State yet exporting timber in small amounts, and that is Maine. Wood must be grown in the places that are topographically adapted to that purpose. Iowa never can supply itself with lumber because it has not got the land with which to do it. Iowa land is too valuable to grow trees. Pennsylvania can, New York may, but the minute you cross the Alleghenies and until you get to the Rockies, there isn't a solitary State that can supply itself with lumber. Nationally, therefore our industries can't go on, our food can't be produced, unless some arrangement can be made by which the lumber that is necessary can be grown in the States that are topographically adapted to growing it.

That means, then, that the States that have no lumber, like Iowa, are vastly more interested in the lumber in the States that have lumber, like Washington, than the people in Washington themselves. We in Pennsylvania, unable to supply our own needs, can live only so long as the exportable surplus from some of the other States will keep us alive; but the minute those other States begin to go short, they won't cut off their own supplies, they will cut off ours, and we will be the first people to suffer. It is absolutely true that what is done with the forests in California, Washington, Oregon, Idaho and Montana is vastly more important to the people of Iowa, Illinois, Ohio and Pennsylvania than it is to the people in the States where the lumber grows.

The South will be exhausted in ten years and perhaps before; then we will have to go across the continent to these other States. Half of all the standing timber in America is in Washington, Oregon, and California. If you add the Rocky Mountain States, 61% of the standing timber in America is west of the Great Plains, and there is where our supply has got to come from, during the time between the exhaustion of the South and the growth of our own forests. If that is true then we have got an interest in the protection of these forests that far exceeds the interests of the people in Washington and the other timbered States themselves.

This is a national question. It can't be handled from the point of view of any single State. We have already disposed more or less of the chance of getting timber from outside of the boundaries of the nation. Then it becomes clear, that this is a question in which every one of the untimbered or deforested States has fully as great a stake as the forest States. Fifteen of the States are timber exporting, thirty three are timber importing. Of the timber exporting States, five are very close to the time when they will become timber importing. Within ten years another five will have gone over, so that in ten years we will find substantially that our supply of timber is coming from Washington, Oregon, and California. That will mean that 95% of the people of the United States are dependent upon timber in States that contain 5% of the population. Already it is true that 82% of the farm values and 88% of the manufactures are in States whose own supplies of timber are not sufficient. And there we come straight to the big conflict that is going on now before Congress as to the two methods of handling the situation.

Foresters, I am sorry to say, are split on this question. Some believe that the matter ought to be left to the individual States.

Some of the rest, and I am one of them, who believe that the only way is for the nation as a whole to take control and say to the people in the States that have the lumber without our industries can not go on, "You must stop forest devastation; you must handle your timber in such a way as not to destroy the producing power of your land." It is a national crisis of the first water and must be met nationally or it can not be met at all.

I do not want to bother you with a discussion of the detail of the Snell and Capper bills, nor of the reasons why I do not believe the Snell Bill can possibly be effective for the purpose at which it apparently is aimed. I do want to say that in addition to the remedies that we can control inside of the borders of Pennsylvania, there must be a remedy in which the nation is concerned, for we have passed the point where we ourselves can save ourselves. We are at a place through our own fault out of which Pennsylvania can not pull herself. We have had the benefit of our lumber, and as the Governor said, we have this timber of ours in order to be the largest home owning State of the nation, but we are paying a part of the penalty already in ways such as the destruction of towns like Norwich, the very post office of which has been abolished all that however, is mere chicken feed compared with the essential fact that we can not go on at all unless we get lumber.

First, fire prevention, acquisition, a good forest organization here in Pennsylvania; and second, such control naturally of the states that still have the lumber that is essential to our living as will prevent them from devastating their lands. These, to my mind, are the four points which answer Mr. Clark's question.

THE FOREST AND INDUSTRY

by

W. L. CUMINGS.

The relation of forestry to the steel industry is a very important one. To be sure it is not of as immediate importance as it was to the iron industry of say 90 years ago, when the latter's very existence depended on a supply of wood for charcoal. In those days of course charcoal was used in place of coke for the reduction of iron ore to pig iron. It is a fact however that a modern steel plant involves so many and varied processes and operations that the use of forest products is still of great importance in every phase of the industry.

There is yet a charcoal iron industry which is consuming important quantities of timber but happily it is not consuming much of Pennsylvania's timber. According to the Iron and Steel Directory for 1920 there were 28 charcoal blast furnaces then in operation in the U. S. Their rated capacity was about 500,000 tons of pig iron. This required about 1,300,000 cords of wood which at 25 cords per acre accounted for about 50,000 acres of forest land.

Using these figures Michigan with a furnace capacity of 280,000 tons of charcoal iron, probably uses about 28,000 acres of woodland annually for making charcoal. Pennsylvania has but two furnaces with a combined capacity of 4,200 tons which would indicate a cutting of about 400 acres. Both these furnaces are located in Centre County.

In passing it may be of interest to refer to the former charcoal iron industry and to indicate briefly its effect on the present forest situation. In a volume by John B. Pearse published in 1876 and entitled. "Iron Manufacture in the U. S.," statistics are given which show the consumption of wood for charcoal production. In Berks Co. alone in 1828-30 there were 11 furnaces and 19 forges in operation. Together they consumed 75,000 cords of wood each year, or probably about 3,000 acres were cut annually for this purpose in that county.

It appears from these statistics however that about 9 cords of wood were used to produce one ton of pig iron so that charcoal furnace practice has evidently improved due to larger furnaces, etc.

At first thought it might be supposed that the use of timber around a steel plant would be quite negligable. I have therefore prepared some rather hurried statistics which I think show that this is not the case. The details of these statistics also show that most of this timber originated at points outside the State and that the cost was excessive due to the transportation. The cost of steel and the ultimate cost to the consumer is thus shown to be appreciably higher by the fact that Pennsylvania cannot supply our timber needs. With the great freight rate increses now in force this cost will be increased over the figures given. As an instance of this we recently received at Bethlehem a carload of lumber from W. Va. on which the freight was $300 or exactly the cost of the lumber at point of shipment.

The total lumber bill of the Bethlehem Steel Corporation for 1920 was about $2,500,000. This includes the supplies furnished 4 steel plants, 4 shipyards and mining quarry and subsidiary R. R. properties. Of this amount about 1/2 went to the shipyards, the Union plant at San Francisco being the largest user because of great activity and relative cheapness of timber on the Pacific Coast.

At the three steel plants located in Pennsylvania the total cost of timber was about $1,000,000, 80% of which probably came from outside the State.

Included in the above amount .were some items of possible interest. For instance, we used 660,000 kegs at Lebanon and Reading plant, the cost of the lumber being $80,000. The staves for these kegs were of Virginia yellow pine, the hardwood heads being of Virginia, Michigan and Pennsylvania material.

The same plants used over 800,000 feet for packing boxes of gum and southern pine. Most of this material came from Maryland and Virginia.

At our Saucon plant in Bethlehem we used 1,500,000 feet of oak, beech, birch, maple etc., for blocking. This, I am glad to say was all from Pennsylvania timber.

Our inventory at the Lehigh plant on Dec. 31, 1919, showed 16 varieties of lumber on hand as follows:— White Pine, Poplar, Beech, Maple, Gum, Hickory, Spruce, Oregon Pine, Yellow Pine, Elm, Hemlock, Teak, and Mahogany.

Some special figures of interest. At the Lehigh plant alone there were used in 1920 178 cars of lumber aggregating 2,800,000 B. M. and costing over $150,000.

Of this probably the greatest volume is used for car blocking and boxing of machinery. By car blocking is meant the blocking of steel and machinery on cars so that it cannot get loose during shipment.

During the height of our war work the receipts ran as high as 1,000,000 ft. B. M. per month and probably averaged 600,000 which at $75.00 per M represents a monthly cost of $45,000.00 per mo. or $540,000 per year. This was for the Lehigh plant alone. Much of this was for ammunition boxes and blocking for guns for shipment. Nothing further is needed to show the importance of the wood industry in war time as far as the steel industry is concerned. These figures include however, some mahogany at $250.00 per M used for templates and some teak at $300 to $500 per M. used for spare part boxes and for foot boards on English artillery.

A use of timber strictly related to ordnance is the use of birch and beech for use as blocking for holding the tools that cut the rifling on the large guns. Other varities have been tested but none found as suitable. Another special use is that of hammer boards on drop forge hammers. Many varieties of wood have been tested but only the very highest grade of maple has been found suitable. This cost $185.00 per M.

At this time when the conservation of our forests is so imperative it should be interesting to discuss those industries in which the use of wood is actually decreasing. In other words instead of trying to stimulate and expand the use of wood, should we not welcome the substition of other materials wherever possible? If this is so it will be cheering to glance at the shipbuilding industry, which as you know is a component part of the business of the Bethlehem Steel Company.

The following brief notes give some idea of the use of wood in modern ship yards:

The use that consumes the greatest volume of timber is probably that of staging, shoring etc., used in the actual launching of ships. You have all seen views of launchings or attended them and know of the large amount of timber used as staging before the actual launching of the ship. Fortunately this timber is used over and over again until actually worn out. This timber is generally yellow pine.

There is also a considerable amount of soft wood used in making of patterns and particularly of templates for the location of rivet holes etc.

In the construction of modern steel ships, the use of wood is, of course, at a minimum.

It may be of interest to you to hear the cost of timber entering into the construction of a modern freighter costing about $1,500,000. The main items would be as follows:

Deck covering, ...	$4,300
Carpenter Labor, ...	6,000
Masts & Spars, ...	700
Total, ...	$11,000

This is at the rate of about 3/4 of 1% of the total cost of the ship.

In a modern tanker the amount is even less and does not amount to much over 1/2 of 1% of the total cost. In passenger ships there is of course much more timber used and this generally consists of mahogany, white pine and poplar. Cypress is used around the crews, quarters. In refrigerating ships we have the maximum use of wood as these are essentially of an ice-box construction.

The use of teak for the deck coverings of ships is an interesting item. The specifications for the modern battleships require that the deck covering of the main , upper and superstructure decks shall be of teak 3½″ thick. This is almost the only wood used on fighting craft as the tendency is to have all interior finish & even furniture of steel. As a special mark of respect it is to be noted that the captain's cabin is still finished in wood while the other officers must be contented with a narrow strip of wood along the side of each bunk to protect them from the chilling effect of the steel ship plates.

In a modern passenger steamer 500′ long the teak for deck covering would at present prices cost $100,000. If white pine be substituted this is reduced to about $60,000. Teak is said to be especially suitable for a material to be placed in contract with steel as it does not cause rusting in the latter when wet.

Mines and quarries are now necessary branches of large steel companies. The Bethlehem Steel Company operates 3 large groups of coal mines one being in Pennsylvania. It also operates an iron mine at Cornwall and 5 quarries in this State. All these properties use timber, the greatest consumer being the coal mines, but as underground iron mining at Cornwall is now planned, this will in a few years be a heavy user of timber also.

As regards coal mining, I asked Mr. T. R. Johns, our General Manager of Coal Mines, for his views and give same below:

"The relation of forestry to most of the coal companies is characterized by a lack of any forestal policy whatsoever. It is one of the phases of coal mining industry that has been sadly neglected. While at first glance the two may not seem to have any intimate association, on a close inspection they are seen to be closely related. While they are directly opposed to each other in principle, as one represents the exploitation of a natural resource and the other stands for conservation; yet a sound policy of forestry is necessary for a real efficient system of coal mining. Not only from a managerial standpoint of facilitating production but from the viewpoint of economy, is this necessary. Coal companies by removing the coal, often cause serious damage to the surface and are liable to damage suits for resulting injuries. These lands together with what the company owns of that nature should be made to support a growth of trees, as very often they are unfitted for an agricultural crop. The rising costs of low grade lumber and relative scarcity of timber used in connection with mining is sufficient evidence of a lack of foresightedness on the part of the companies who could very readily produce all the lumber that they would consume in their operations. A more careful attitude will be prompted by the depletion or the exhaustion of the southern timber supply. When the center of the lumber industry moves westward permanently and the coal companies are forced to pay excessive tariff rates for their lumber, then they will be prompted in their actions by the knowledge that if they had efficiently and prudently managed their surface lands, it never would have been necessary to import lumber and timber for the mines."

I might add that at our coal property in Indiana County we are not cutting any of our own timber for mine props. We can buy it nearby at fair prices and prefer to keep our own for the future

While the actual forestry work of our company is a very modest showing, I am glad to say that we have done something. In 1919 we started planting on three tracts owned by the company and up to the present have planted as follows:

At Cornwall, Pa. on lands near the Cornwall mines,	66,300
At Hanover, Pa., on waste quarry lands,	11,000
At Heilwood, Pa., on waste coal mine lands,	74,000
Total,	151,300

On the property at Cornwall which was purchased in 1919 there was already a planting of 10,000 trees, so we have a total planting of a little over 160,000 trees. It is planned to add to this each year.

All these seedings have been received from the State Forestry Department and planted after personal inspection of the ground by their representatives. I wish to take this occasion of expressing our appreciation of their interest in the work and their enthusiasm in aiding anyone that shows an interest in forest work.

Our company operates two saw mills, one at Cornwall and one at a quarry property in New Jersey, and our cutting is carried on along scientific lines. So far it has been confined to dead chesnut or to timber that had to be removed to make way for certain improvements. In the case of railroad ties we have effected a saving of at least 50 cents per tie by having our own saw mills.

At Cornwall we keep one man constantly employed whose work is to cut dead chestnut and also keep fire breaks open, burn brush and prevent forest fires.

I have for exhibition a map of our little forest reserve at Cornwall, showing our various plantings etc. This may be of possible interest.

A little removed from forestry but related to it is the planting of shade trees in our mining towns. In 1920 we planted 1000 shade trees at our Heilwood coal property in Indiana County, Pennsylvania, and also 1000 at our Reedsville coal property in West Virginia.

I believe all the officials of the Bethlehem Steel Corporation are very glad indeed that there is a real awakening in forestry in Pennsylvania. Everyone has spoken of our own modest start at our mines and quarries with genuine enthusiasm. I believe it is realized that forestry is something beyond the means and waiting power of most individuals but that it is properly a function of large corporations that are practically perpetual.

While forestry by them is a matter of dollars and cents, it is also a civic duty that redounds to the general happiness and welfare of the general public.

In examining mining properties for the Bethlehem Steel Co., and formerly for other companies, I have had rather exceptional chances to observe forest conditions and forest sentiment in widely scattered points, as for instance, Canada, Newfoundland, the southern and western States and practically all of South America. As a result of these observations I think we in Pennsylvania are probably in the lead as far as real forestry sentiment and real forestry work is concerned. Bad off as we are it may perhaps be comforting to know that other localities are in a worse condition or at least will be in a few years.

I happen to be a native of Grand Rapids, Michigan, a city almost dependent on forest products. It has always been a source of wonder to me that there is so little real forestry sentiment in Michigan and I feel that it is almost justice that most Grand Rapids furniture is made from timber from Tennessee, Mississippi, etc. Thirty years ago Dr. Beal, of the Agricultural College, was trying to get the State to start a small forest reserve in the northern part of the Southern Peninsula on the pine barrens and cut over pine lands. Every effort would be defeated by the real estate agents who preferred to sell the land to settlers and then sit back and watch them starve.

Personally, I think, we have ten times as much forest sentiment in Pennsylvania as in Michigan and I believe Michigan will some day buy lumber in Pennsylvania.

Canada, too, is behind us. With its rapid consumption of timber and destruction by fire we can expect little relief by purchasing timber from there, at least from Eastern Canada.

If we wish to come nearer home and find conditions worse than our own take a look at West Virginia. If one wants to see a real American desert let him go to Tucker County, W. Va., back of Thomas. There he can see hundreds of thousands of acres of glistening white rocks where was formerly the finest spruce south of New York. Cutting here has just been concluded and was done by large companies able to do something, but I have never heard any sentiment as to reforestation or regret that fires go over this area periodically.

In Pennsylvania we have much to be thankful for.

First, the topography of the State is in our favor. The long parallel mountain ridges with cultivated valleys between afford ideal conditions for prevention of large forest fires that can run practically uncontrolled in Northern Michigan and Canada.

Second, we have a real sentiment among the growing generation as to the value of forests. While on a walk with my children, aged 8 and 9, I built a fire in the woods. I was amazed at the earnestness with which they absolutely commanded me to see that every bit of fire was extinguished before we left the place. This of course comes from instruction in the public schools.

Third, we have a real practical State Forest Service that is doing things and of which we should all be proud. My opinion is that we can at least say we are ahead of any other State and I think some of us will live to see Pennsylvania regain a prominent place in the lumber industry.

THE FOREST AND WOOD SUBSTITUTES

by

HAROLD S. BETTS.

The present age has been called the age of substitutes. While the word "substitute" carries with it the feeling that the new article is not as good as the original, this may or may not be true. In building and construction materials wood is to a large extent being satisfactorily replaced by cement, brick, iron, and steel. In other uses, such as furniture for the home, vehicle spokes, railroad ties, implements of sport including gunstocks, base ball bats, golf clubs, and tennis racquets, there is considerable doubt as to whether wood can ever be satisfactorily replaced. The picture of home-run Baker performing with a cast iron or concrete bat does not seem quite fitting. Wood is adapted to such a wide range of uses and wood products are so comparatively easy to make and finish and can be so easily altered that the average American finds it hard to imagine a satisfactory existence without considerable wood in his home and available for his use.

Wood substitutes may be considered under three divisions: First, building and construction; second, other uses of wood in which there is substitution; and third, the uses of materials made from wood where the final product has been changed by passing through some process. Among such products are paper, fiber silk, etc.

General building and construction are by far the largest consumers of lumber in the United States. Approximately two-thirds of the annual lumber cut is used for building purposes. The five principal building materials used in the United States are lumber, concrete, steel and brick and other clay products. Brick, one of the oldest known construction materials, has always been a competitor of lumber, while concrete has been an active competitor only since 1900. In part these substitutes can be interchangeably, for example, in the side walls of houses. For the framework of the modern skyscraper steel alone is suitable. Similarly in large dams concrete can hardly be regarded as a substitute for wood. As a matter of fact, for many purposes the use of concrete actually increases the demand for lumber which is used to build the forms required to hold the concrete while it is hardening. Exact data on the total substitution for lumber in general building and construction can not be obtained. Economic considerations and such statistics as are available, however, point to the same conclusion; namely, that substitution for lumber in general building and construction is already large and is increasing. Among the principal factors responsible for this situation are the completion of the bulk of construction in the great agricultural regions, the rapid increase of population in our cities as compared with the rural population, increases in lumber prices which until the last few years have been greater in proportion than increases in the prices of competing materials, and the greater amount of special services which has been rendered to consumers by the substitute industries. Lumber consumption in the United States reached its maximum in 1907, and since that time the use of lumber in general building and construction has probably fallen off over 5 billion feet. During the same period the general increase in steel consumption was about 45 per cent, and that of cement about 50 per cent, while if carried back to 1900 the increase in cement consumption will probably be in the neighborhood of 300 per cent. Clay building products also show an increased consumption of 20 per cent for the period from 1907 to just before the war. The use of nails, which is sometimes taken as a criterion of the amount of lumber used for building purposes, reached its highest point in 1909, and from that time to the beginning of the war fell off some 20 per cent. At best the wooden building is no more than holding its own, while the total building curve is rising. Statistics compiled from circularizing retail lumber dealers show their estimate of the decrease in sales of lumber for construction purposes due to substitutes to have been in the neighborhood of 13 per cent between 1907 and 1914 alone. The consumption of lumber in temporary forms, such as are used in concrete work, has increased to some extent, and in addition a certain amount of wood is used permanently in connection with the replacement of wood by cement. These factors offset to a small degree the percentages first mentioned. Considering all the available factors, a substitution of about 15 per cent of the present consumption of lumber in general building and construction is indicated. If the logical increase in demand for buildings is taken into account, it is probable that about 5 billion board feet of lumber have been displaced by competing materials.

The wooden tie is the only construction material which seems to stand practically alone in its field. None of the numerous attempts to find a satisfactory substitute have yet been successful. The wooden tie will probably continue to hold its own against substitutes for a long time to come, although the annual consumption of ties may fall off as larger percentages are treated against decay and protected by tie plates.

Fencing, sidewalks, roofing, and lath are other uses of wood which may be classed under building and construction and in which substitution has made heavy inroads. The extent to which substitutes have replaced wooden fences is difficult to realize until one compares the fences of 20 years ago, when barbed and woven wire fences were coming into use, with those of today. At that time the manufacture of wooden fencing was a flourishing industry. The only available statistics indicate that various types of wire fences make up at least three-quarters of the total fencing on average farm lands. The demand for wooden fence posts has decreased much less than for fencing, although steel and reinforced concrete posts are being used in increasing quantities.

The wooden sidewalk in common use 25 years ago in a large percentage of cities and small towns is now practically a thing of the past. Statistics on the amount of sidewalk laid in over 500 cities in 1915 show that wooden sidewalks made up less than 1 per cent of the total.

Stronger attempts have been made to displace wooden shingles as a roofing material than in the case of any other use of wood. Agitation on the subject of fire hazard has probably been the most effective cause in displacing the wooden shingle. Statistics available at the present time indicate that the use of shingles was reduced by about one-half in the period from 1907 to 1914 by the substitution of other materials, including slate, asphalt, tile, and various prepared roofings.

The wooden lath is being replaced by wall and plaster board and metal lath. Figures are not available on which to base a reliable estimate of the extent of this substitution, but it is certain that the use of the substitutes is increasing rapidly and apparently will continue to do so.

Uses of wood other than building and construction in which there is substitution to a greater or less degree include boxes, railroad cars, furniture, vehicles, ships, silos, windmills, cooperage, and fuel. Wooden or shook boxes have been replaced to a considerable extent by the fibre container and the veneer package. This, however, is largely a substitution of wood in a changed form for ordinary box lumber. The change has been largely due to lower costs and lighter weights which mean lower freight charges. While cost and weight have been very important factors in the competition of the different kinds of boxes other factors, such as the reliability of the box under various conditions, will undoubtedly continue to be the subject of controversy between manufacturers of containers, purchasers, freight agencies, and railroad commissions to the varying advantage and disadvantage of the different types of containers. Such controversy is made possible largely by lack of authentic information which is being gradually supplied by scientific tests and the preparation of standard specifications and by the systematic collection of statistics on breakage and losses in transit. It is interesting to note in this connection that the damage claims of the railroads for the last year due very largely to faulty shipping containers aggregated some 50 million dollars.

Railroad cars have been large consumers of lumber in the past, but like the wooden sidewalk the all-wooden car is practically a thing of the past. Both passenger and freight cars constructed partially or wholly of steel have replaced the all-wood car. The "safety first" propaganda was probably the largest single influence in bringing about this change. Orders for all-wood cars which in 1905 made up 80 per cent of the orders for all freight cars had dropped to 5 per cent in 1914. In the case of passenger cars available records indicate that only one wooden car was ordered in 1915.

Furniture is one of the wood products in which all of us have seen a considerable amount of substitution take place.

Both metal furniture and reed furniture are being used in increasing quantities, especially metal office furniture. The increased use of metal beds is also a familiar example of replacement, although I believe that within the last few years there has been a reaction in favor of wood. The production of metal furniture will increase in the future if past tendencies indicate what to expect. The demand for furniture is, however, so large that wood is expected to hold its own in quantity consumed even with the growing use of substitutes.

In the vehicle industry the factor which has lessened the demand for wood is the automobile. The tremendous growth of the automobile industry has not only absorbed the normal increase in the horse-drawn vehicle industry but has actually decreased its output. In addition to the decreased production caused by the competition of automobiles, there has been an actual substitution of materials, such as steel and aluminum, for wood in horse-drawn vehicles. The automobile in its early days used an appreciable amount of wood, while the present day machine contains very little, probably not more than 200 board feet per machine. However, in the matter of spokes, for which the makers of many of the most expensive machines consider nothing so satisfactory as hickory, great difficulty has been encountered in securing an adequate supply of raw material. Representatives of several of the larger companies have come to the Forest Service to find out whether there was any more hickory and if so, where it was located or whether it would be necessary for them to abandon their favorite type of hickory spoke wheel and turn entirely to wire wheels or disk wheels.

The days of the wooden ship have long been past, and the use of wood as a structural material is now confined to comparatively small vessels. During the war the Emergency Fleet Corporation carried through the building of a large number of wooden vessels to meet an emergency. The tonnage of wooden vessels decreased approximately 50 per cent in the period from 1880 to 1914. The continued use of wood for certain types of ships, such as small coastwise freighters and small boats and also for interior work of certain kinds on steel ships, seems assured. The decreasing demand for wood in the larger vessels is an indication of future substitution, but it is not improbable that substitution has been carried nearly to the limit in ship building as a whole.

Silos and windmills are two things in which wood has been largely replaced by concrete and metal. It is estimated from the available data that about 50 per cent of the silos are built of materials other than wood and that about 75 per cent of the windmills are built of steel.

The use of wood in both the tight and slack cooperage industries has been held back by substitutes. In the handling of oil the steel tank car, the pipe line, the tank ship, the steel storage tank, the tank wagon, and the tin case have taken the place of a large number of tight barrels. Prohibition has cut deeply into a special use for tight cooperage. The glass bottle has also checked the consumption of wood in barrels. It is probable that some 6,000,000 tight barrels have been replaced by other forms of containers. Slack cooperage has among its competitors the metal slack barrel, the veneer barrel, cotton, jute and paper sacks, and the fiber box. The growing tendency to market various food and other products in small containers is responsible for considerable substitution. Ease in handling, cleanliness, and advertising value have all helped to push the small package in place of the slack barrel. It is estimated from the data available that the use of substitutes has cut down the manufacture of slack barrels by about one-third of the average annual production.

More wood is used for fuel in the United States than for any other one purpose. Coal, oil, gas, and electricity are in growing use as substitutes, chiefly on account of their greater convenience and the growing scarcity of wood. The most reliable estimates indicate a falling off of more than 50 per cent or some 50,000,000 cords a year in the use of firewood since 1880. This reduction is equivalent to 15,000,000,000 board feet or nearly one-half the present lumber cut.

Wooden stave pipe is a product that is coming into increasing use for conveying municipal water supplies for long distances, especially in the West. There is apparently a definite field for wooden water pipe, and a growing consumption of wood for this purpose may be expected.

Paving blocks of wood have been in use for a long time. Few were treated with a preservative up to 15 or 20 years ago and decay was quite rapid. The treated blocks were a great improvement, and their use increased quite rapidly up to 1911. Since then it has fallen off over 50 per cent due at least in part to competing materials

The use of wood in such miscellaneous articles as pails, tubs, agricultural implements, chairs, and kitchen cabinets has been considerably reduced by the substitution of other materials. Galvanized iron pails and tubs are used almost entirely instead of those of wood. The wooden kitchen cabinet has an active rival in the steel cabinet. A large number of agricultural implements show a decreasing proportion of wood in their construction.

The third class of materials discussed in this paper includes woodpulp and chemical products.

The annual pulpwood consumption of the United States has increased until it has reached a total of over 5,000,000 cords. The field of pulp and paper products appears to be unlimited During recent years fabrics, rugs, artificial silks, twine, rope, etc., have been successfully put on the market. While numerous attempts have been made to substitute other materials for wood in the manufacture of paper, nothing has so far been found to satisfactorily take its place, and it is doubtful if anything ever will be. The growing shortage of pulpwood has brought home to pulp and paper men the precarious situation of their industry in the regions of its development and the realization that the industry is absolutely dependent on the failing timber supplies.

To sum up the situation, the replacement of lumber alone by substitute materials, such as cement and steel, has reached the tremendous annual total of over 8,000,000,000 board feet, about one quarter of the lumber cut. In spite, however, of the wide and increasing use of substitutes for wood, the United States is rapidly approaching the condition of many European countries in which lumber is an imported luxury. Fifteen years ago the consumption of lumber for each person in the United States was about 516 board feet; six years ago it was about 375 board feet; now it is only 312. In France the lumber consumption for each person is the small amount of 50 board feet.

The substitution of other materials for wood has come about largely because of the increasing scarcity and consequent higher prices of wood, and, also, because for certain purposes changing conditions have made other materials more satisfactory than wood. The so-called skyscraper is made possible only by the use of steel instead of wood for structural purposes.

The scarcity and high price of lumber has been a serious handicap in making up the shortage of homes, and the output of many industries dependent on wood for their raw material has been curtailed. If the per capita consumption of wood in this country is reduced below a certain minimum, a lowering of the standards of living will result. There will be not only a readjustment of many industries, but also a distinct check in the development of the country.

The use of substitutes has undoubtedly lessened the drain on the forests. Substitution, however, has sometimes been merely the replacement of some of the more valuable species of wood by others generally less satisfactory. In some instances substitution has simply meant the replacement of lumber in one form by wood in another form, a good example being the use of the fiber box for the wooden box.

Whatever service the use of substitutes for wood is rendering in view of the incipient timber shortage, the problem can not be solved in that way. The public is more than ever concerned that provision should be made for caring for the remaining forests of the country, for growing new forests, and for obtaining the most efficient use of wood in all the industries that employ it.

THE FOREST AND THE MINE

by

BENJAMIN M. CLARK.

Mr. Chairman, Ladies and Gentlemen: I am here today in response to an invitation extended by our worthy Governor to discuss the relation of the forest to the mine. My experience in connection with the mining industry of the State has been entirely confined to that of bituminous coal mining and my comments will be strictly confined to that particular industry.

I have been specially requested to confine my remarks to the following propositions:

1. Demand for wood or timber in the coal mining industry.

2. Present and future supply.

3. What portion of the demand can be furnished within our own State boundaries and what from without?

4. How many years will the supply be available and to what source shall we turn when our State's supply is exhausted?

Answering these propositions generally, the coal mining industry needs wood or timber in the form of manufactured sawed lumber of all kinds, ties, props, mine caps, sprags, rollers and cross bars. The past supply in the early years of the mining industry was easily obtainable within the counties in which the coal mines were located. The present supply and particularly for the past four or five years has been much more difficult to obtain. The saw and bill lumber has been largely obtained outside of the State, principally from the southern States, while ties, props, mine caps and like material has been secured from within the State but at a distance of from one to three hundred miles from the location of the mine. The future supply must be secured largely from other States unless the foresight of the individual consumer or the citizens of the Commonwealth of Pennsylvania through its Forestry Department provide the ways and means of reforesting the devastated timber lands and the scientific and careful study, treatment and cultivation of the seedling to encourage rapid growth in order to provide the demands of the wood users of the Commonwealth.

Speaking particularly of the western part of the Commonwealth or rather from the center of the State to the western border line, saw timber has been exhausted and the second growth timber that necessarily must be of the smaller sizes and which is used for the purpose of ties, mine caps, sprags, rollers and cross bars is very rapidly disappearing, and at a rate that will within from five to ten years exhaust the second growth supply which will necessarily force the consumer in the mining industry to the southern and far western States for a future supply unless the individual consumer provides ways and means of taking care of himself, or the great Commonwealth of Pennsylvania through its Forestry Department reforests the many thousands of acres of waste lands in the State of Pennsylvania, provided no substitute can be found to take the place of timber at a reasonable cost to the consumer.

It may not be amiss or out of place to review the personal experience of the Rochester & Pittsburgh Coal & Iron Company with which I am connected which has been engaged in the active mining of bituminous coal for the past forty years in the counties of Clearfield, Jefferson, Armstrong and Indiana. This review will produce pertinent facts on the subject matter that we are now discussing. In the early days of this company's operations, say in the years 1881 and for quite a few years following, not only in the counties in which the mines were located but in adjoining counties tract after tract of white pine, hemlock, oak and other hardwood timbers covered acre after acre. I can well remember the day when our company would not think of using any other kind of timber for its purposes other than white pine. Hemlock, oak and other hardwoods were cut from the ground and burned to make room for tipple, town and railroad sites. The waste of these last mentioned woods was extravagant or even criminal. This was carried on until white pine became scarce and we were forced to use other woods such as hemlock, chestnut and oak. I have seen hemlock timber in the State of Pennsylvania advance from $2 and $3 and $5 an acre to $100 and $150 an acre and today it is practically all gone. The hardwoods have likewise advanced in value and have almost entirely disappeared in so far as virgin timber is concerned.

Within our own organization we have discussed time and time again the future supply of timber for mining operations. At the conclusion of each discussion we all agreed that the day was rapidly approaching when we would be without suffiicient timber supply in the State of Pennsylvania at least at convenient points to our mining operations and that we would have to resort to substitutes or procure a supply from distant lands. All of which meant a considerable increase in the cost of producing a ton of coal. We resolved time and time again to take action to protect our interests on this point and many times the resolution through rush of business interests was forgotten. We finally, however, got into action. We not only saw our future timber supply rapidly disappearing but a wonderful degree of waste in the manufacture of our timber supply by those from whom we purchased. We started in not only to protect our supply for the future but to eliminate the waste in the production of the same.

We first secured a man who had years of experience in the manufacture of wood, a builder and designer, experienced in the construction and operation of mill plants, modern ideas in the elimination of waste and above everything else of keen executive ability along these lines. In addition to that we employed expert woodsmen who knew how to cut down and transport timber trees from the lands to the mills in up-to-date modern methods, who knew how to estimate and figure the value of timber from any and every standpoint. From these two central points we built up strong organizations that covered everything from the selection and purchase of the timber to the logging, transportation and manufacture of the same, and today have logging equipment, transportation equipment and mill equipment that we do not believe can be excelled in the State of Pennsylvania or any other State. We use every part of the tree, the saw dust, the limbs, bark and trunk. We log with motors, we transport our logs with tramroads, railroads and auto trucks. Our mills are operated with electricity. We use the limbs of trees to make sprags, trolley poles, wire guards and various sized rollers. We take crooked sticks and manufacture them into straight sticks, and carry the entire proposition on at a very low cost of production.

We first started out in the procurement of a supply of timber lands in purchasing timber within the counties in which our mines were located. These tracts thus purchased were not only scattered throughout the region but were not of large acreage. We finally realized that the logical course to pursue was to purchase a large acreage of contiguous timber land if it could be found. We finally succeeded in buying about 15,000 acres of timber land in Center and Clinton Counties which practically consist of one solid tract of land, being well located with reference to streams and public highways. Our interests figure that it possibly will be ten to fifteen years before we start to operate this timber. In the meantime we propose to take the best of care of it by placing care takers upon the premises sufficient to protect the property against fires. We do not propose to shut the public out from fishing and hunting expeditions on these lands but will permit the use of the lands for these purposes under the strictest regulations as to prohibiting the destruction of timber by fire or otherwise. We expect to frequently counsel with the State Forestry Department, seeking advice as to the care and preservation of the property and in the promotion of the growth of timber. We expect through the aid, advice and science of the Forestry Department of the Commonwealth of Pennsylvania that when we finish cutting the last of this timber that we will be ready to start to cut the next growth which should be far enough along at the points we first started to cut to furnish us timber equally as good as now stands on the tract.

We keep accurate figures on our consumption of timber. During the period from April 1, 1920 to April 1, 1921 we used in sawed and manufactured lumber 2,812,501 feet; ties 304,900; props 3½ to 8 feet in length 1,152,676; mine caps 616,935; sprags 4,550 and mine rollers 4,158. Figuring the same at current prices the value of this production consumed was $333,311.92. The mining region in which we are located is designated as the Central Pennsylvania Coal Field which includes the counties of Center, Blair, Cambria, Elk, Jefferson, Indiana, Clinton, Armstrong and Clearfield. These counties produce approximately 60,000,000 tons of coal annually, of which during the past year our interests produced about one-tenth. Assuming that other mining companies consumed about the same amount of timber as our interests do, the total consumption by the mining industry in these counties will readily be shown by multiplying the figures given as to our own consumption by ten which would mean in figures as follows:

Sawed lumber	28,125,010	feet,
Ties	3,049,000	"
Props	11,526,760	"
Mine Caps	61,169,350	"
Sprags	45,500	"
Mine Rollers	41,580	"

with a total value in dollars and cents at current prices of $3,333,119.20. In addition to this consumption should be added the consumption of timber in the counties of Westmoreland, Somerset, Fayette, Allegheny, Washington, Butler, Mercer and part of Lawrence. Without having definite figures to make a computation I believe it would be safe in saying that the figures produced for the Central Pennsylvania District would be doubled by the consumption in the counties last above named.

Figuring on our past years' record, we produced 5.5 tons of coal per mine prop, 2 tons of coal per tie, .2 of a ton of coal per board feet sawed timber and 1 ton of coal per mine cap. Our total consumption last year amounted to about 20 million feet.

We saved nearly sufficient waste to pay for sawing. On this particular tract there was about 30 acres in timber which cut as follows:

203,000 ft. saw timber of which 80,000 ft. cut into mine car lumber at a value of $60.00 per thousand on cars.

123,000 ft. cut into brattice boards, mine ties and cross bars at a value of $30.00 per thousand on cars.

After this timber was taken out we cut into the tops and branches of trees and secured,—

33,000—3½ and 4 ft. props, Value on cars, ...	$2,640.00
250—motor ties, Value on cars, ...	87.50
5,200—Dogwood sprags, Value on cars, ...	260.00
300—Trolley Poles, Value on cars, ...	270.00
1,200—Mine Rollers, Value on cars, ...	420.00
	$3,677.50

Our aim has been to conserve and during the year we have installed in our plant a trolley pole machine with which we turn all trolley poles used at the mines, using mostly waste strips of timber that will cut out 3″ X 3″ X 6 ft. We also installed an automatic lathe with which we turn sprags out of waste timber that will cut 2¼″ X 2¼″ X 18″ and mine rollers out of waste timber which will cut 6″ X 6″ X 18″. Rollers and sprags are turned mostly out of short sections of timber which are too crooked to cut into timber requiring long lengths. Side strips and edgings are ripped into and resawed into ½" X 4" for guard boards, used to guard electric lines in mines. Slabs and short waste lumber are cut into mine caps using pieces down to 1" X 4" X 12". Sawdust and other small offal are used to fire boiler for drying lumber and heating plant during winter months.

Taking the number of pieces used in mine caps and props and ties and reducing it to feet, it means that we used last year in the neighborhood of 20,000,000 feet of lumber, and it was not a normal year; we did no particular house building last year. I would say from these figures that on a basis of ten million tons capacity that our consumption would run from thirty to thirty-five million feet of lumber in a year. We have the timber land; you have our theory and our policy. The question and problem is, can it work out along the lines that we have outlined? We are deeply interested in the prevention of fire. We have on this timber tract care-takers. This time of year we add considerable men. We try to cultivate a good feeling in the neighborhood; we permit people to hunt and fish on this land, but everyone under a strict permit and strict regulations as to fire. By reason of these conditions, by reason of the treatment of the people that live in the vicinity along the lines that they are being treated, there is much interest in protecting that forest reserve up there as a rule, and they do care. I believe that our estimate of burnt over territory on that tract of timber is only thirty acres in timber that has been growing there from twenty to twenty five years, which shows pretty good care of it.

THE MODERN TREND OF WOOD CONSUMPTION

by

OVID M. BUTLER.

Mr. Chairman and Ladies and Gentlemen: Since listening to the many interesting papers that have been given here, I have been somewhat puzzled as to just what Mr. Pinchot had in mind when he asked me to speak on "The Modern Trend of Wood Consumption." It seems to me that every paper which has been read here might well have had that title. If I rightly conceived what he had in mind, it was the present day tendency in wood utilization, and the thoughts I have to present are based on that general premise. Much has been said here about the consumption of wood, but this conference has not begun to bring out the extent to which wood enters our social and industrial lives. You gentlemen have been thinking largely in terms of raw wood; that is only one phase of the whole wood utilization problem.

From time to time, optimistic individuals in apparent efforts to leaven the forest problem, advance the argument that our consumption of lumber is on the decline. They point to the fact that a number of years ago our per capita consumption was around 500 board feet annually, whereas today it is about 300 feet. From this we are expected to conclude that in the course of a generation or two, the average American citizen will have arrived unsuspectingly and painlessly at the woodless age.

It must be apparent to any one who has given the subject much thought that the per capita consumption of lumber is not a true index of the trend of wood consumption in this country. Not only is our population increasing rapidly but our knowledge of wood is gradually expanding our use of the forests to products other than lumber. Through that knowledge we are gradually coming to a new conception and a new appraisement of forests and their values. We are coming more and more to look upon the forest, not as potential wood pile, from which you and I as average American citizens use 300 feet of boards annually, but as a cupboard to which we may turn for a great variety of products essential to our prosperity and well being.

In this cupboard we have already discovered, in addition to lumber and other forms of raw wood, such products as wood alcohol, ethyl alcohol, acetic acid, turpentine, rosin, charcoal, pulp and paper, gun powder, pine tar, tannic acid, balsam, storax, and a number of more minor products. It is somewhat of a surprise to many people to be told that after some 40 centuries of wood using civilization, wood as an organic material is as yet little understood. What additional values lie concealed in its structure, we do not know. The chemistry of wood cellulose has been little studied and remains a secret. When we consider the products which the forest now provides we are apt to be over-awed with admiration, but it is my judgment that we are merely at the threshold of knowledge with respect to the products which ultimately will be derived from wood.

Mrs. Dibert told you last night about the extent that wood enters the home. I suspect that wood is in Mrs. Dibert's home and the home of everyone here in many ways that they do not know anything about. She mentioned the Victrola, which is made of wood and comes in a wooden box, but she did not mention the records which produce the music; they are sixty per cent. wood; she did not mention the linoleum on the floor; she did not mention the turpentine in the paint on the outside of the house, or the rosin that is in the washing soap, and so on and so on.

This trend in our wood consumption towards the conversion of wood into more diversified products is, in a measure, limited by our knowledge of wood and its properties. It is obvious that we could not have obtained a high grade of grain alcohol from wood without first learning that the wood of certain species is convertible into sugars which can be extracted and fermented. Therefore, the more we know about our different woods, the greater the possibilities of finding new uses for them and new values in them. By way of further illustration, let me cite an experiment now under way by the Forest Service at Madison, showing how one discovery may lead to another and thus extend the value of wood to a new and unsuspecting element of our population. By a modification of the process by which a certain percentage of the wood is converted into sugar, a cattle food preparation was made from white pine sawdust and a carefully recorded feeding trial was conducted by the Wisconsin College of Agriculture. A small herd of dairy cows was selected and the preparation was fed for several weeks as part of a standard ration. The results in terms of milk production, butter fat and weight of the animals, were so surprisingly gratifying both to the cows and the scientists that the feeding experiment is now being repeated in order to prove that figures do not lie. If, in this particular case, they do not, there is no reason why practically all of our less resinous conifers are not suitable for the product.

I would like to bring to your attention another direction in which this scientific trend of wood consumption, if I may so term it, is taking us and is influencing our wood consumption. Twenty years ago, the fibre box was not much in evidence but during the intervening years that industry has doubled itself every five years until today it is consuming 2,300,000 tons of pulp, most of which originally came from the forest. About 80 per cent of those boxes are made out of old waste papers repulped and manufactured into paper board. You can readily appreciate how a process of that character tends to relieve the annual drain upon our standing timber. Consider in this same connection, the extent to which a process which will successfully de-ink newsprint paper so it may be reused as newsprint, will relieve the drain upon the forest. The discovery of such a process is, I believe, only a question of time.

Our dependency upon the forest as a source of paper and the scores of articles made out of wood-pulp is only too well known. Eighty per cent of our wood-pulp production is drawn from species which make only three per cent of our standing timber. We must and we are learning how to use other species of wood for paper, species of which the supply is greater. Within the past six months, the Forest Service has worked out a modified sulphate process whereby the Southern pines, which at the present time are successfully pulped only for kraft wrapping paper, can be commercially manufactured into high grade book paper. Developments of that character have direct and important application in the solution of the forest problem. They tend to alleviate the effects of species and regional depletion by making available new species and new regions as a source of supply.

That is, with the better use of the forest we have left, it is my belief that it is possible, with the information we now have available, to reduce the drain upon the forest from 25% to 33% if we will only learn how to use that information. That is an illustration right there, the process which made it possible to use old newspapers. The question was ask yesterday about the re-use of newspapers. That is one way in which it has already been re-used. Men are working on a process to treat old newspapers in a way by which they can be reused for newspaper. That is not now possible, but I believe it is only a question of a short time until it will be possible. Such a process will relieve a big drain upon the forest. But we bear in mind that while these processes tend to relieve the drain, they do not make wood less important.

A great deal has been said about boxes. I would like to illustrate in this connection. During the last two years the Forest Service has extended its studies of wood. We established a large revolving drum, so that when a box was put in there and the drum was started the box was given a treatment very similar to what it would get in actual handling when being shipped on railroads. One-fifth of the lumber cut annually goes into boxes, and it is the object of those tests to develop the best for a given purpose. As you know, there are all kinds of boxes; different designs made according to different ideas, but I do not think anybody who knows very much about the subject will today say that he knows which is the best box for a given purpose. There are many who think they do. For example, we made a survey of the methods by which automobile manufacturers in this country crate their machines for export shipment. We found that every manufacturer had a different method of crating his automobiles and each declared that his was the best. There was no common standard. The crating was largely left to a head carpenter. They all thought they had the best method of crating automobiles; in other words, in this one city I think we found twelve "best methods" of crating automobiles.

They simplify the forester's problem of producing new timber for special products by enabling him to select for planting or regeneration fast-growing species where slow-growing species are now being used.

In the past ten years we have acquired more scientific knowledge about our different species of wood then in the whole 300 years preceding. That has supplied the underlying stimulus to another trend in wood consumption, namely, the more economical use of raw wood in its manufacture into finished articles or their parts. There is available today a great mass of accurate information on the mechanical and physical properties of our many different species of wood, which was not available ten or fifteen years ago. Such information is opening the door to more exact utilization, based upon the requirements of use and the properties of the species. Wood using tradition has done many a good species an injustice but happily the tendency of research is to reduce tradition and custom to a chart of accurate facts.

There is an important element of this trend which I should like to emphasize because it is the most encouraging thing in our whole wood using world. A decade ago, it was difficult to interest the manufacture of wood in what may be called "technical knowledge", that is, exact and reliable knowledge based upon scientific studies of wood. The manufacturer's yard stick of standards, probably since tree growth began, has been "practical knowledge", that is, knowledge based upon experience, rule-of-thumb methods, and customs, often passed down from one generation to another. It was exceedingly difficult and usually impossible to sell him the scientific viewpoint and one of the greatest obstacles with which the pioneers in wood research were confronted was to get the results of their labors put into use.

Today conditions are changing. Progressive manufacturers are not only seeking technical knowledge but they are employing technical men and educating their responsible employes along technical wood lines. For example, the Forest Products Laboratory, during the last year or two, has been giving periodic ten-day courses of instruction in kiln drying lumber and in box construction, imposing a co-operative fee of $150 and $100, respectively, per man. Over 200 men have been sent by their employers to attend these courses. Representing almost 40 different industries, they have come from 30 different States, stretching from Maine to Hawaii. Such a thing as ten or twelve hard-headed factory superintendents gathered about a table in a laboratory studying wood, would have been not only impossible but dangerous ten or fifteen years ago.

There are many other evidences that throughout the whole wood using industry, the trend is towards a better knowledge of the properties of wood. Many of the wood using industries, which a few years ago could not have raised a sympathetic word for research, are today contributing actual cash in order to have their wood problems studied in the laboratory by trained research workers. The idea that by a better knowledge of the material with which you work, you can more economically convert that material into finished products, is getting across. Industry is beginning to recognize that that idea put to use carries great possibilities for saving money and for saving timber.

I would like to cite several illustrations of how it works. During the last two years the Forest Service, at Madison, has extended its studies to the utilization of wood for boxes or shipping containers. A box may not appeal to you as a work of art or a particularly necessary article in our body politic. I doubt, however, if there is any other single way in which wood serves more people in this country than in the form of a box. Almost everything we eat and wear, most of our furniture, and the innumerable articles we buy from the retail stores, have been transported in a box of some kind. Of the total amount of lumber which we consume annually, it is estimated that almost one-fifth is used for boxes. They are made in many different forms with many different designs. Each box is like a chain—as strong as its weakest link. When a box fails in transit, there is a loss which must be charged off. Every year the railroads pay for loss and damage claims on goods shipped over $100,000,000. Of course, the public eventually pays the bill.

Custom has had a strong hold upon the box maker. When the Forest Service first began to test boxes to determine the best way to make a box for a given purpose it was not uncommon to hear the assertion that this box or that box could not be improved upon. Customs work in many peculiar and diverse ways. For example, we just recently tested some of the standard boxes which bring you your breakfast apples from a far distant part of the country. You may have noticed that apple and orange boxes are usually packed so that there is a decided bulge in the sides. The purpose of the bulge is mainly psychological. It is to make the purchaser feel that he is getting good measure for his money. When these boxes were tested the bulge in the sides was found to be the weak link and the principal source of breakage and loss in shipment, but when it was suggested to the makers that the bulge be reduced, they threw up their hands and maintained that it would ruin their business.

A great many boxes used for widely different purposes have been subjected to these scientific tests and with few exceptions, it has been shown that by certain modifications and changes in design, it is possible to construct better boxes with a decided saving in lumber. A representative of the National Association of Box Manufacturers, who has been following this testing work very closely, has reached the conclusion that by the development of balanced box construction, it is possible to reduce by 25 per cent the amount of lumber now going into boxes and at the same time make better boxes than at present. Still further savings are possible with no loss in the efficiency of the box by developing balanced construction of wood and wire strapping. Such boxes permit the use of thinner lumber.

As another illustration let us take the use of forests for railroad ties. Approximately 120,000,000 ties are used annually by our railroad and electric lines. Since this wood is used in contact with the soil it is especially subject to decay unless treated with protective preservatives. At the present time about 28 per cent of the ties used annually are treated and their average life is about 15 years, whereas that of the untreated tie is only about 7½ years. The wood preserving industry has made rapid progress in the last decade in developing better methods of treating timber and with the knowledge now available it would be possible to save almost two billion board feet of timber annually if all railway ties were properly treated. If that statement is extended to include other forms of lumber such as poles, posts, piles, mine props, and shingles used under conditions subject to decay the annual saving would be more than double.

Taking still another example; the seasoning of lumber after it has been cut. There are large aggregate losses in both air seasoning and in kiln drying and the gradual accumulation of knowledge as to how to extract the moisture from wood, is stimulating a trend towards better methods of drying and consequent savings of wood. It is not the part of wisdom estimate the saving possible in this field. We know too little about it. Why one wood seasons easily and another very difficultly is as yet unexplained. We merely know that to get the best results we must consider each species as a problem of its own. After all, our tree specices are much like children. One, you can rule with a rod and get effective results quickly, another you must humor and nurse very carefully and scientifically and arrive at your object slowly. There is gradually being built up and put into practice standard methods of drying applicable to the different important species. That means lumber saved.

How, you may possibly ask, does this trend in wood consumption figure in the forest problem of any State? I think you will agree that the two big issues for State and nation to consider are, first, to provide a permanent forest principal, and second, to make the forests still remaining last as long as possible by applying the most economical methods of utilization. It has been said that a forest saved is a forest grown and I do not need to call to your minds the time it requires to grow a forest. We have estimated that if full use were made of the information now available our annual cut could be reduced about one-third. That is equivalent to raising approximately ten billion feet on a one-year rotation. It would save a year's supply for the whole nation every fourth year.

I have said that the trend is towards better utilization. Now a trend is defined as an inclination in a given direction, and one might justly be accused of exaggeration if he described the situation as more than a trend. The great need, from the standpoint of conserving the timber we still have, is to educate the men who convert forests into commercial products and the people who demand those products, in the science of more economical utilization. In the past and at the present time this work has largely devolved upon the national government. There are few, if any, States which have as a part of their forest departments, an organization whose single purpose is to promote better utilization throughout the wood using industry of the State or to act as a clearing house for these industries, of technical information resulting from research now in progress. The field of service is a big one. It is loaded with immediate possibilities for keeping up a forest principal within the State and for reducing imports of lumber from distant regions at high freight rates.

A Commonwealth like the great State of Pennsylvania can well consider the establishment, as a part of its forest department, of an office of forest utilization. The object of this office need not be restricted merely to promoting in an educational way more economic utilization of the forests and their products. It can render assistance of great public value by studying the wood using problems of the State and by bringing to bear upon them the best thought and information of the day. With a growing sentiment in favor of closer and more exact use of wood, I believe that it is to the interest of every State and of the nation as a whole, to make the most of it.

SECOND DAY—AFTERNOON SESSION.

April 14, 1921.

Mr. PINCHOT: Ladies and Gentlemen, the meeting will please come to order. The Committee on Resolutions, I understand, is ready to report.

REPORT OF THE RESOLUTIONS COMMITTEE.

Mr. CLARK, CHAIRMAN: Mr. Chairman, the Committee on Resolutions beg leave to make the following report; in fact, we have two or three reports to make and I will take them up in sections.

WHEREAS, the State of Pennsylvania, one first among the lumber producing States, is now deforested and unable to supply more than one-fifth of the lumber without which her people cannot earn their living; and

WHEREAS, the supplies of lumber from beyond her own boundaries upon which Pennsylvania now depends are on the verge of exhaustion; and

WHEREAS, wood is the most generally used of all materials; and

WHEREAS, an ample supply of wood is essential not only to the prosperity but to the very existence of agriculture, industry, transportation, business in all its branches; and defence of the State.

WHEREAS, the first stages of the coming shortage of lumber have already made their presence felt; and

WHEREAS, Pennsylvania has land enough, unfit for agriculture and now idle, to grow the timber this Commonwealth must have or fail; be it

RESOLVED, that this Conference of Wood-Users urges upon the people and the Legislature of Pennsylvania the absolute and most pressing necessity, in the interest of industry, agriculture, transportation, defence of the State, and its people, for the protection of forests against fire, for the acquisition of additional State Forest lands; and for whatever other measures may be required to restore to production with the least possible delay the forest lands of Pennsylvania.

AND, RESOLVED, that this Conference emphatically joins in the demand of the Pennsylvania State Chamber of Commerce that this Legislature appropriate not less than one million dollars for the prevention and extinction of forest fires, and such other sums as may be necessary to carry out the wise and statesmanlike plan of Governor Sproul for the restoration of Penn's Woods.

AND, RESOLVED, FURTHER, that a copy of this resolution be placed in the hands of the Governor, the heads of the State Departments, and of every member of the Pennsylvania Legislature.

WHEREAS, the Conference of Wood-Users assembled at the State Capitol an April 13th and 14th, 1921, at the invitation of Governor Sproul, realizing the value of the experience, service, ability and enthusiasm of the present Commissioner of Forestry, think it eminently fit and proper that it be resolved,

First, That this Conference extend to the Honorable Gifford Pinchot its thanks and appreciation for the valuable service he is rendering to the Commonwealth of Pennsylvania, and congratulate the Honorable William C. Sproul, Governor, for his wisdom and foresight in the selection of a man of the knowledge, experience, energy, type and character of the present Commissioner of Forestry, and that we offer to the Governor and Commissioner of Forestry our hearty co-operation and support.

Second, That this conference recommend to the Governor, the Commissioner of Insurance and the Commissioner of Forestry to take up and consider ways and means of providing insurance against the destruction and loss of growing timber by fire and otherwise, with the hope that some feasible plans can be devolved to further develop and encourage the reforestation of the waste lands of Pennsylvania.

WHEREAS—The Conference of Pennsylvania Wood-Users, assembled in the State Capitol, Harrisburg, Pa., on April 13 and 14 having been made acquainted through talks given with the splendid service the Boy Scouts are rendering in the extinction and prevention of forest fires.

BE IT RESOLVED—That this Conference extend to them, through Mr. Pinchot, State Commissioner of Forestry, our thanks and appreciation for their service, interest and co-operation in helping to preserve Penn's Woods.

IT WAS MOVED, SECONDED AND CARRIED,

that the Resolutions be adopted as read.

THE FOREST AND LABOR.

by

JOHN A. PHILLIPS.

The lumber industry is one of the ranking industries of the country. Next to agriculture, it is the largest industry that depends for its operation on the product of the land—timber. There are some 800,000 wage earners engaged in converting the forests of this country into lumber and other forest products. Of this, some 150,000 to 175,000 men, are working in the woods, in cutting down trees and getting out logs to the mill. These are the lumber jacks, the heroes of many a song typified in the mythical lumber jack, Paul Bunyan. It is their brawn and sweat that helped to hew our great republic out of a forest wilderness. Their life, workmanship, and their welfare are closely bound up with the destinies of our timber lands.

The lumber industry passed over this country from ocean to ocean in a series of waves. It originated in Maine, moved to Pennsylvania and Michigan in the 70's, completed its highest development in the Lake States in the 90's, and is now at its peak in the Southeast. There it will be exhausted in a few decades, and will then center on the Pacific Coast. As a rule, it has not left permanent communities in its wake, unless the land was exceptionally suited to agriculture. Each successive chapter in the history of the lumber industry has been a story of depletion and migration. In the 60's the State of Pennsylvania led in the production of lumber, and now one city district consumes more than the total lumber cut of the State. Dreary wastes, dismantled sawmills, and deserted towns are now the only depressing reminders of the day when Pennsylvania supplied the markets of a large portion of the eastern United States. The industry has been, and still is, conducted as a type of mining. A valley or logging unit is worked out and then the operation shifts to another location. In this way, one valley after another has been cleared of timber, and left empty and desolate. One region after another has been depleted of its forest wealth. Such destruction of our timber lands deeply affected the lumber worker. It shrunk his opportunities for permanent employment. In the early 70's there were in Pennsylvania close to 18,000 lumber workers; today there are not more than half that number, and that is mostly working in the mills on timber imported from other States.

Destructive lumbering has turned the lumber jack into a migratory laborer, a "blanket stiff," a "timber wolf," going from camp to camp seeking a better job. One reason why the lumber workers are migratory is because the lumber industry is migratory. Since the lumber jack must live in camp, and a man with a family is excluded as a worker, the lumber industry is an industry of homeless men. The ill effects of forest devastation, upon the consumers and the country at large, have long been dwelt upon, yet the inevitable effects upon the worker involved have hardly been mentioned. The conditions surrounding these men have however, received national attention during the past two years, on account of the strategic industrial importance of lumber operations in the conduct of the war. These conditions were made the subject, in part, of investigations conducted in 1917 by the President's Mediation Commission, of which the Secretary of Labor was chairman. This investigation showed that about 90 per cent of the lumber jacks were unmarried, and that the annual labor turn-over in the lumber camps was over 600 per cent. "There has been a failure," the report stated, "to make these camps communities. It is not to be wondered, then, that in too many of these workers, the instinct of workmanship is impaired. They are, or rather have been made, disintegrating forces in society." Largely as the result of the destructive lumbering as is now carried on in this country, the better class of labor, which was unwilling to raise families in temporary shacks, has been eliminated. Thus, the old New England stock of lumber jacks have now passed for the most part into oblivion. The negro of the South, and the nondescript races, who are willing to accept lower standards of living, are now appearing in the camps. Good citizens can not be reared under such conditions.

Yet work in the woods, instead of having ill effects upon labor, could be made one of the most healthful occupations, tending to the upbuilding of bodily strength and moral character. All that is necessary is that the lumber industry should use the forest not as a mine, to be abandoned when depleted, but as a renewable resource in permanent use. When, instead of a tramp industry, the lumber industry will become permanent in each timber region, the population supported by the sawmill, and the forest operations, would develop into real communities and not mere shack towns. Only then will it be possible to maintain proper housing and living conditions; the workers will have an opportunity to exercise their rights as citizens and voters; will be able to enjoy schools, churches, and other educational facilities, and would have means for co-operation among themselves to improve their economic and social welfare.

Management of forest resources on a permanent basis is not a dream, or even an experiment. Just compare conditions as they prevail in our forest industry with those in the same industry in France or Belgium. In those countries where the forest is treated as a permanent resource, employment is continuous, and the general conditions, as a rule, better in the forest industry than in other industries. They, indeed, closely approach conditions in the agricultural industry, and with it form a firm bulwark instead of a source of weakness in the national life.

In Europe sustained production of the forests forms the backbone of an economic system of small holdings, especially when dealing with poor agricultural land. In Switzerland a forest of 10,000 acres, with an adjoining area of 3,000 acres of agricultural land, supports a prosperous permanent community of 1,500 people. About 81 per cent of all the workmen employed in the woods and mills in Europe are small holders of land within or adjacent to the forest. The southwestern part of France in the Landes, which have been reforested for the last sixty years, contained before reforestation a population of 1,600 people. Since the forests were established this region supports a population of 14,000.

What permanent utilization of our forest lands means to our working men, may be inferred from an estimate recently made by the United States Forest Service. The Government has estimated that the forests of the country, under a proper system of timber culture, could provide permanent employment for over 700,000 men in the woods alone which, counting the families of the workers, would thus support a population of about 3½ millions of people instead of 150,000 of homeless men as at present.

The basis for each forest community would be the area within whose radius an annual cut may be permanently maintained. A sawmill suitably located within the area, and continuously supplied with timber from the growth on land tributary to it, would form the basis of a sawmill community which could remain permanently in one location. The logging camps, which may have to change from time to time, would still form a part of the entire forest community organization. The welfare of the woods worker and forest conservation are tied most closely together. It is in the interests of our country, in the interests of productive efficiency and good citizenship that our forests should be kept permanently productive.

Apart from the formal paper, and speaking for the State Federation of Labor, and because of our knowledge of what has already been done by the Pennsylvania Department, we are of the opinion that Pennsylvania is to be congratulated upon having secured as the director of its activities in this work the one man who perhaps above all others in America is eminently fitted to do the big job which has been mapped out. I thank you.

LIST OF ATTENDANTS AT WOOD-USERS' CONFERENCE IN HARRISBURG, APRIL 13 AND 14, AND THE COMPANIES REPRESENTED.

R. B. Abbott,
Philadelphia & Reading Rwy.,
Reading, Penn'a.

F. J. Angier,
Baltimore & Ohio R. R.,
Baltimore, Maryland.

A. F. Backlin,
American Steel Wire Co.,
Pittsburgh, Penn'a.

J. E. Baker,
J. E. Baker Company,
York, Penn'a.

D. C. Bakewell,
Duquesne Steel Foundry Co.,
Pittsburgh, Penn'a.

J. H. Barnhart,
H. C. Frick Coke Co.,
Scranton, Penn'a.

J. N. Barr,
Oil City Rotary Club,
First National Bank Bldg.,
Oil City, Penn'a.

John G. Benedict,
Landis Machine Co.,
Waynesboro, Penn'a.

E. O. Berger,
Hillman Coal & Coke Co.,
Pittsburgh, Penn'a.

B. O. Brill,
The J. G. Brill Co.,
Philadelphia, Penn'a.

H. R. Bristol,
Delaware & Hudson Co.,
Plattsburg, N. Y.

P. D. Brown,
The Berwind-White Coal Mining Co.,
1138 Commercial Trust Building,
Philadelphia, Penn'a.

Ovid M. Butler,
Forest Products Laboratory,
Madison, Wisconsin.

A. P. Cameron,
Westmoreland Coal Co.,
Irwin, Penn'a.

B. M. Clark,
Rochester & Pittsburgh Coal & Iron Co.,
Indiana, Penn'a.

Donald K. Cocklin,
Butler & Elm Streets,
Penbrook, Penn'a.

Willis Cowan,
Warren Mirror Co.,
Warren, Penn'a.

Raymond Cross,
United Natural Gas Co.,
Oil City, Penn'a.

Clyde B. Crusan,
Wentz Company,
1727 Land Title Bldg.,
Philadelphia, Penn'a.

W. L. Cumings,
Bethlehem Steel Co.,
Bethlehem, Penn'a.

P. H. Curry,
South Penn Oil Co.,
Pittsburgh, Penn'a.

Mrs. G. W. Dibert,
Housekeepers' Civic Club,
611 Swank Bldg.,
Johnstown, Penn'a.

D. Owen Brooke,
Birdsboro Steel Foundry & Machine Co.,
Birdsboro, Penn'a.

A. B. Farquhar,
National Conservation Asso.,
York, Penn'a.

John Foley, Forester,
Pennsylvania System,
Philadelphia, Penn'a.

Seth E. Gordon,
State Game Commission,
Harrisburg Penn'a.

George R. Green,
Forestry Department,
State College, Penn'a.

John Hoffer,
Harrisburg, Penn'a.

D. C. Hosfield,
Bell Telephone Co., of Pa.,
1631 Arch Street,
Philadelphia, Penn'a.

Edward Hughes,
The Lehigh Coal & Navigation Co.,
437 Chestnut Street,
Philadelphia, Penn'a.

S. P. Hutchinson,
Westmoreland Coal Co.,
222 South Third St.,
Philadelphia Penn'a.

Wm. B. McCaleb,
Pennsylvania Railroad,
Philadelphia, Penn'a.

J. Eugene McKelvey,
McKelvey Bros.,
Hollidaysburg, Penn'a.

John A. McSparran,
State Grange,
Furniss, Penn'a.

J. F. Macklin, Pres.,
Ebensburg Coal Co.,
731 Land Title Bldg.,
Philadelphia, Penn'a.

Willard M. Drake,
State Forest Academy,
Mont Alto, Penn'a.

John M. Jamison,
Jamison Coal & Coke Co.,
Greensburg, Penn'a.

Elisha K. Kane,
Kushequa, Penn'a.

Russell H. Kent,
The Kent Manufacturing Co.,
Clifton Heights, Penn'a.

R. E. Krape,
Consolidated Lumber & Supply Co.,
Indiana, Penn'a.

J. D. Landis,
Philadelphia & Reading Rwy. Co.,
Reading Terminal,
Philadelphia, Penn'a.

C. A. Leighton,
Lehigh & Wilkes-Barre Coal Co.,
Wilkes-Barre, Penn'a.

George E. Lippincott,
539 Land Title Bldg.,
Philadelphia, Penn'a.

H. F. Seiler,
Western Electric Co.,
Philadelphia, Penn'a.

E. L. Solomon,
The Kingston Coal Co.,
Kingston, Penn'a.

E. J. Stackpole,
Harrisburg Telegraph,
Harrisburg, Penn'a.

A. B. Stewart,
The Davis Coal & Coke Co.,
Continental Bldg.,
Baltimore, Md.

R. D. Tonkin,
Clearfield Bituminous Coal Corp.,
Indiana, Penn'a.

J. L. Matlick,
Western Electric Co.,
Philadelphia, Penn'a.

P. J. Malloy,
Western Dodson & Co., Inc.,
Bethlehem, Penn'a.

J. H. Mosser,
J. K. Mosser Co.,
Williamsport, Penn'a.

H. M. O'Bleness,
Midvale Steel & Ordnance Co.,
Cambria Steel Co.,
1522 Widener Bldg.,
Philadelphia, Penn'a.

John A. Phillips,
State Federation of Labor,
131 N. 15th St.,
Philadelphia, Penn'a.

A. R. Raymer, Chief Eng.,
Pittsburgh & Lake Erie R. R.,
Pittsburgh, Penn'a.

Geo. S. Shimer, Pres.,
The Milton Mfg. Co.,
Milton, Penn'a.

M. H. Sigafoos, Gen. Mgr.,
Hazard Manutacturing Co.,
Wilkes-Barre, Penn'a.

T. A. Wright,
The Wilkes-Barre Railway Co.,
Wilkes-Barre, Penn'a

W. G. Wyman,
Lovell Mfg. Co.,
Erie, Penn'a.

J. B. Wagner,
New Jersey Zinc Co.,
160 Front St.,
New York, N. Y.

William F. Wagner,
Pooley Furniture Co., Inc.,
16th, 17th & Indiana Ave.,
Philadelphia, Penn'a.

Frank M. Waring,
Tyrone, Penn'a.

Bromley Wharton,
Board Public Charities,
434 Capitol Bldg.,
Harrisburg, Penn'a.

John A. White,
International Motor Co.,
Allentown, Penn'a.

H. B. Wiese,
Parkesburg Iron Co.,
Parkesburg, Penn'a.

F. Uhlenhaut, Jr.,
Philadelphia Company,
435—6th Ave.,
Pittsburgh, Penn'a.

J. B. Yohe, V. P. & G. M.,
Pittsburgh & Lake Erie R. R.,
New York Central,
Pittsburgh, Penn'a.

L. W. Young, Jr.,
South Penn Oil Co.,
Pittsburgh, Penn'a.

PENNSYLVANIA DEPARTMENT OF FORESTRY

PENNSYLVANIA STATE FOREST ACADEMY

MONT ALTO, FRANKLIN COUNTY, PA.

TWENTIETH YEAR—1922-1923

BULLETIN 25

APRIL, 1922

GIFFORD PINCHOT, Commissioner

PENNSYLVANIA DEPARTMENT OF
FORESTRY

PENNSYLVANIA STATE FOREST ACADEMY

MONT ALTO, FRANKLIN COUNTY, PA.

TWENTIETH YEAR—1922-1923

BULLETIN 25

APRIL, 1922

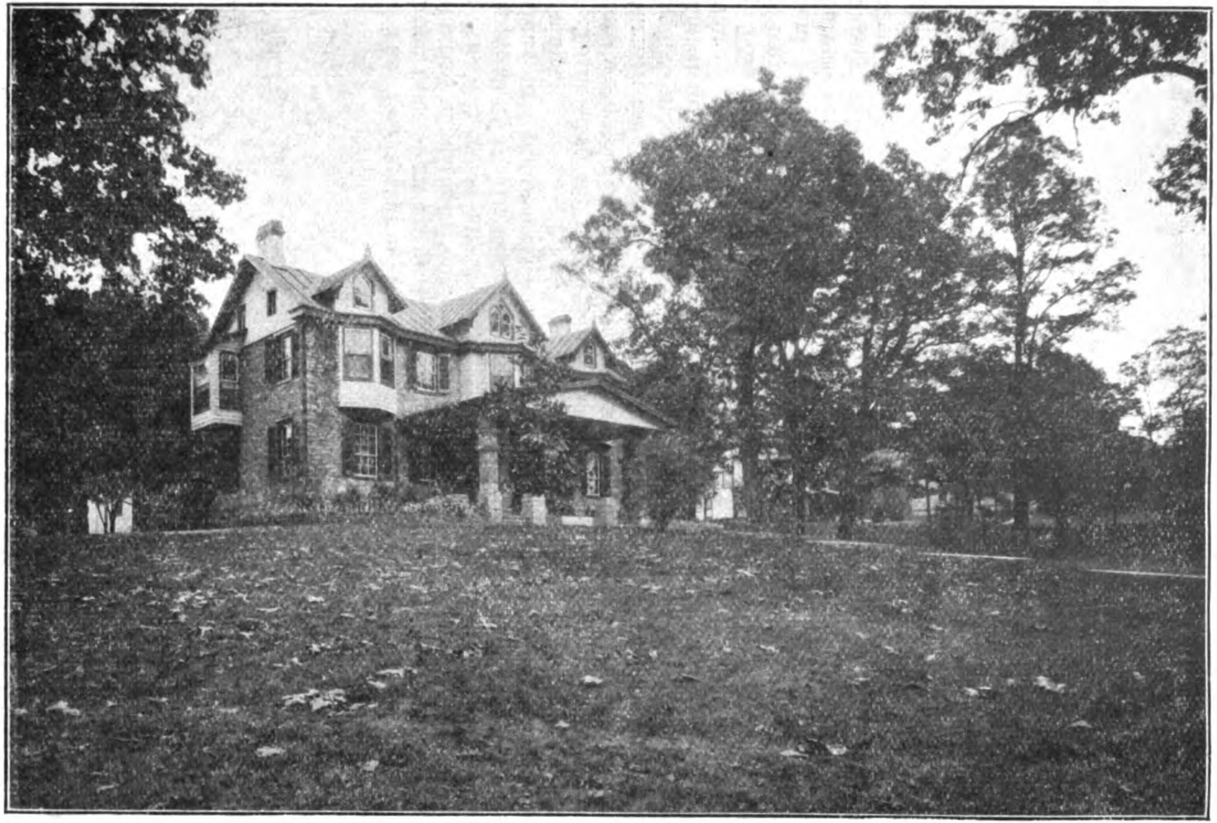
GIFFORD PINCHOT, Commissioner

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST COMMISSION

GIFFORD PINCHOT,
EDWARD BAILEY
HENRY W. SHOEMAKER
MARY FLINN LAWRENCE (Mrs. John W.)

GIFFORD PINCHOT, Commissioner of Forestry.
ROBERT Y. STUART, Deputy Commissioner of Forestry



Weistling Hall. The Faculty Cottage and the Dormitory Are at the Extreme Right

FOREWORD.

The Pennsylvania Department of Forestry has undertaken the huge task of restoring the forests of the State to their original productive condition. Penn's Woods formerly yielded abundant revenue to the owners, steady work for the wage earners, and healthful living conditions to all. Cheap lumber, pure water supply, stream regulations, and the prevention of erosion are among the benefits the forest brings.

To develop the forest land purchased by the State, trained foresters were needed, and as no institution in the State could or would furnish them, the State Forest Academy was organized twenty years ago to meet the emergency. The State now holds almost a million and a quarter acres of forest land and should acquire five million more.

This announcement for the 20th year is made to the people of Pennsylvania to inform them of the progress and standing of the Academy and to bespeak their hearty cooperation in the restoration of the forests of the State. It is not an extravagant claim to say that the safety and prosperity of the entire State hinge on the success or failure of this movement.

THE FACULTY.

Edwin Allen Ziegler, A. M.
Director and Professor of Forestry.

Willard M. Drake, A. B., M. S. F.
Professor of Forestry.

George S. Perry, B. F.
Professor of Forestry.

Coleman J. Harris, A. M., M. S.
Professor of Biology.

Roland W. Brown, B. S.
Professor of Soils and Chemistry.

W. Harold Horning, B. F.
Assistant Professor of Forestry.

Louis C. Loetzer, B. F.
Instructor in Forestry.

SPECIAL LECTURES.

Special courses such as fish and game, and first aid will be given by special lecturers.

In addition an opportunity is given the students to hear special lectures on forestry, botanical and other subjects. Among these special lecturers will be:

Hon. Gifford Pinchot, Commissioner of Forestry.
Dr. John W. Harshberger, University of Pennsylvania.
Dr. O. E. Jennings, University of Pittsburgh.
Mr. R. S. Kellog, Secretary, American Newsprint Association.
Mr. John Foley, Forester, Pennsylvania Railroad.
Colonel Henry W. Shoemaker, Pennsylvania State Forest Commissioner.
Mr. J. S. Illick, Pennsylvania Department of Forestry.
Specialists from U. S. Forest Service, and Pennsylvania Forest Service.

SCHOOL CALENDAR, 1922-1923.

January 3, 1922	Christmas vacation ends.
January 17-21, 1922	First term examinations.
Jan. 23, 1922	Second term begins.
February 22, 1922	Washington's Birthday.
May 30, 1922	Memorial Day.
June 12-17, 1922	Second term examinations.
June 22-23, 1922	Competitive Scholarship Examinations.
June 19, 1922	Summer session begins.
July 4, 1922	Independence Day.
August 3, 1922	Commencement Exercises.
August 4, 1922	Summer session ends.
September 5, 1922	Fall term begins.
November 30, 1922	Thanksgiving Day.
December 15, 1922	Christmas vacation begins.
January 2, 1923,	Christmas vacation ends.
January 15-20, 1923	First term examinations.
January 22, 1923	Second term begins.
February 22, 1923	Washington's Birthday.
May 30, 1923	Memorial Day.
June 11-16, 1923	Second term examinations.
June 21-22, 1923	Competitive scholarship examinations.
June 18, 1923	Summer session begins.
July 4, 1923	Independence Day.
August 2, 1923	Summer session ends.
September 4, 1923	Fall term begins.

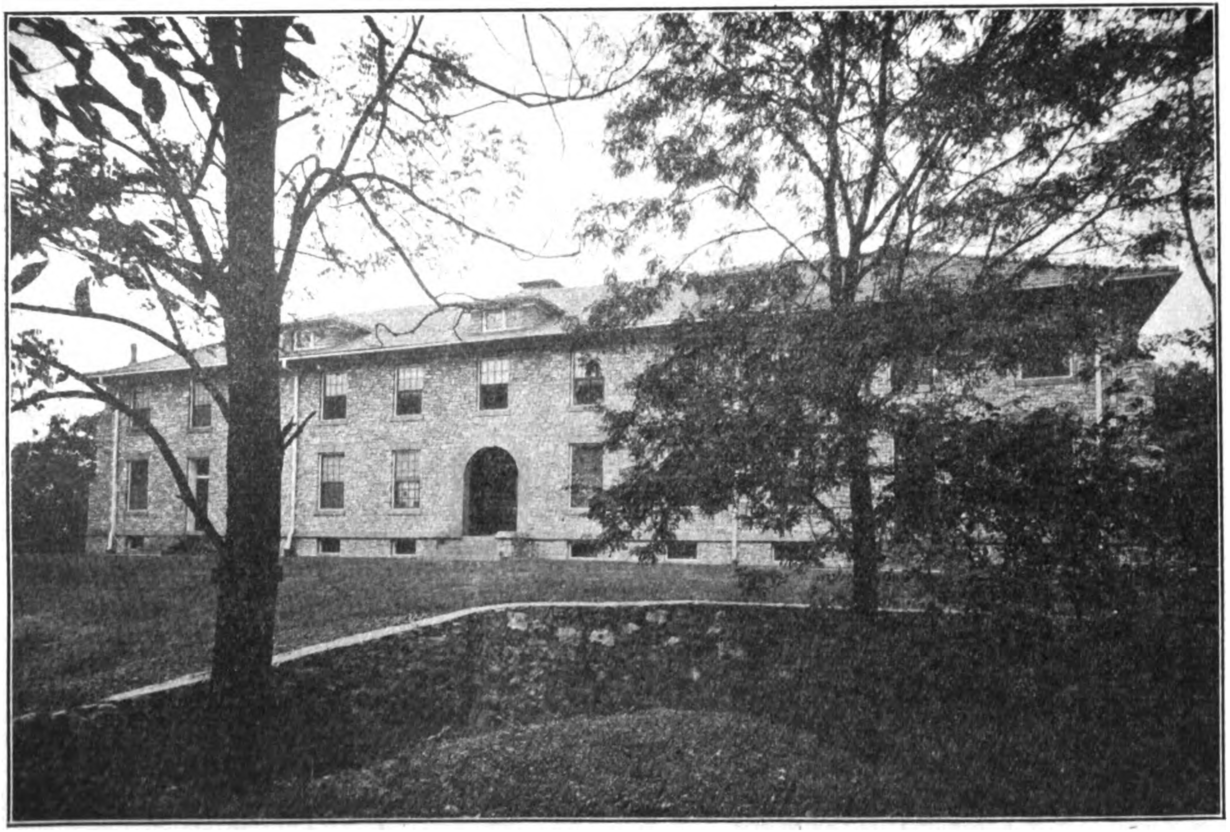
ORIGIN AND EARLY HISTORY.

As early as 1876, in an address before the recently organized American Forestry Association at Philadelphia, Burnett Landreth pointed out the necessity of teaching forestry as a science in itself and not as a branch of agriculture. From that time, throughout the period of agitation and public education which preceded the foundation of the Department of Forestry there continued frequent references to the necessity of such a separate course, or, better still, of a separate school devoted to the teaching of forestry. The European Forest Schools were considered as models, but all recognized the necessity of adapting such a school to American needs and conditions. This agitation was especially strong in the years of 1888 and 1889. During 1889 the trustees of the University of Pennsylvania established a Chair of forestry to be filled as soon as funds became available, but the Chair was never filled.

Because of the slow growth of public sentiment in favor of Forestry, particularly among forest owners, no constructive steps were taken towards the establishment of a technical forestry course until about the year 1900. In issues of "Forest Leaves," in 1901 and 1902, are found several articles dwelling on the necessity of trained men to do forestry work upon the large areas of land which were rapidly passing into the control of the Department of Forestry. Dr. J. T. Rothrock, then Commissioner of Forestry, took the land in this movement. Endeavors were made to have scientific cources in forestry added to the University of Pennsylvania or to Pennsylvania State College. These schools refusel at that time to undertake the work. Appreciating the actual need of men and realizing the great advantages of a practical school connected with actual forest work, Dr. Rothrock decided to establish such a school under the control of the Department of Forestry and locate it upon a State Forest.

In the spring of 1902, Geo. H. Wirt, a Biltmore graduate, was sent to Mont Alto to take charge of the property recently purchased from the Mont Alto Iron Co., and to establish a forest nursery. Although the legislature of 1901 had refused to adopt Dr. Rothrock's plans, he felt sure that two years would find a change in sentiment, and, as a preliminary measure four men were sent to help Mr. Wirt and get some instruction in forestry. In January, 1903, Paul E. Arnold, a German forester, and graduate of the famous Tharandt Forest Academy in Saxony, was added to the teaching force. By act of May 13, 1903, the school was formally established and plans were made for the entrance of the first class. The Forestry Reservation Commission had, however, previously adopted, on June 4, 1902, a curriculum and plan of work submitted by Mr. Wirt for the forest school then in his charge.

The original idea was that the students admitted should be composed of young men from the wooded districts with practical woods experience, and the first class was partly composed of such men. It was soon recognized that these men were often unable to do the mental work required in a study of scientific forestry and the entrance requirements were made strictly competitive with both physique and mental ability entering into the test. This plan was adhered to up to 1920, when non-scholarship students were admitted on proof of standard college entrance preparation.



The Forest Academy Dormitory

At first there was some thought of moving the school to the Caledonia purchase as possessing better facilities, but this was finally given up and the administrative buildings of the old furnace at Mont Alto were utilized for the school. These were far from being ideal, and consequently the school was materially handicapped until 1908, when ground was broken for the first of the present group of modern buildings.

LOCATION.

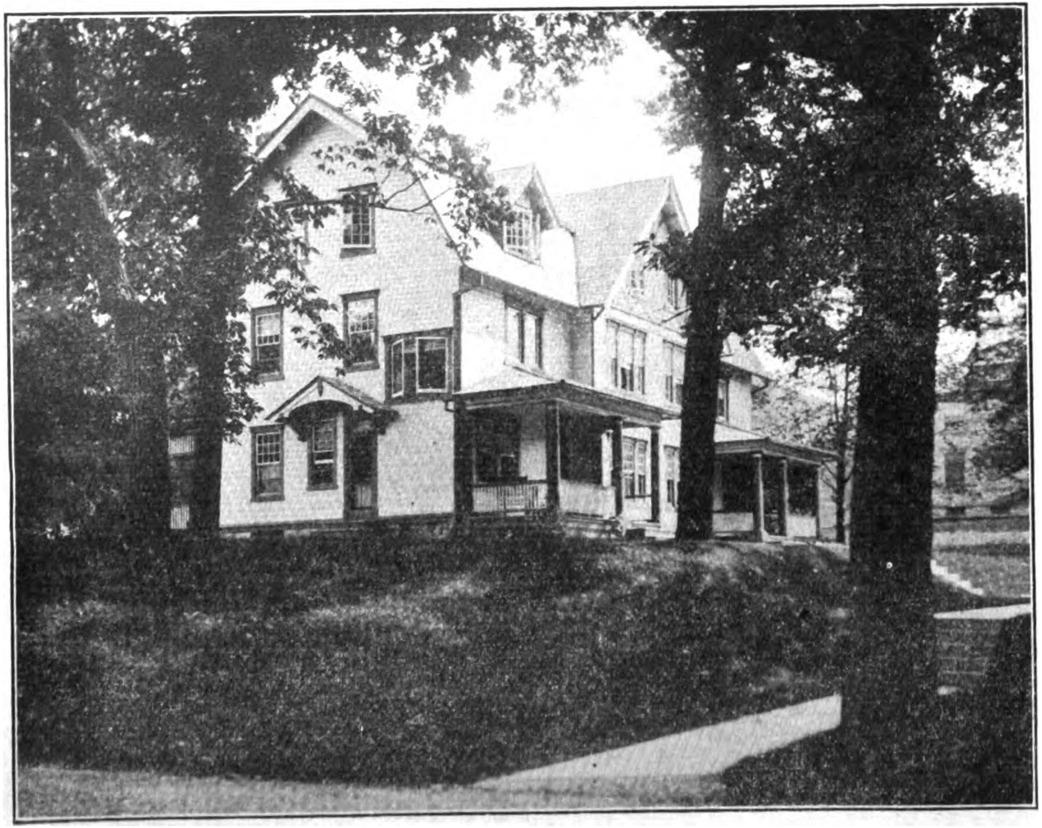
The Pennsylvania State Forest Academy is located about one mile from Mont Alto, a village in Franklin County, which is sixty miles southwest of Harrisburg on the Cumberland Valley Division P. R. R The ground occupied by the school buildings is a part of the Mont Alto State Forest, which affords an opportunity for practical instruction and experimentation equalled by few, if any, American forest schools. One of the foremost forestry educators of the United States called the Pennsylvania State Forest Academy, because of its excellent location, "the gem of American forest schools". The situation is healthful and the school is supplied with water from a spring located in the interior of the 23,000 acre forest. To the west of the school lies the Cumberland Valley which is regarded as one of the garden spots of Pennsylvania, and nearby are some of the most scientifically managed apple and peach orchards of the State.

The forest location of the school stands in strong contrast with those in larger cities and college towns. Such a situation has advantages which make it not only attractive but also convenient for the study and practice of forestry in the forest throughout the year. It enables the student to study forestry rather than about forestry.

BUILDINGS.

Thirteen buildings comprise the Academy group. Weistling Hall the oldest of the buildings, is a large three story structure and was formerly the residence of Col. George B. Wiestling, a member of the first Forestry Commission of Pennsylvania. This building has recently been remodeled and is now used as an administration building. It also contains the dining room, kitchen, and quarters for the matron and servants.

The Main Building was erected in 1908-09. It is the largest building of the group and constructed of a very attractive native quartzite. On the second floor of this building are comfortable living rooms for all the students. The first floor is devoted to class rooms, laboratories, and the library. In the basement are a recreation room, a wood specimen room, and a furnace room. The building is supplied with steam heat, illuminated with electricity, and furnished with necessary toilet rooms and lavatories.



The Faculty Cottage.

A double cottage, occupied by the Director and another member of the faculty, was built in 1911. Three other single cottages are occupied by instructors or are available for their use. Other buildings, such as machine shop, log lodge, gymnasium, sawmill, wagon shed, stable, and seed storage house dot the campus.

CAMPUS

A spacious and attractive campus surrounds the school buildings. Upon it are many native and exotic trees and shrubs. The most distinctive and impressive features of the campus are the massive Black and White Oak trees which are remnants of the original forest and bear mute evidence of many vicissitudes during an existence of more than two centuries. Amidst these stately trees are carefully laid out drives and walks, and a meandering brook of pure mountain water. Overlooking all this picturesqueness is the productive and carefully managed Mont Alto State Forest.

FACILITIES FOR INSTRUCTION.

The facilities at Mont Alto for instruction in forestry compare favorably with any in America. The laboratory equipment is modern and complete. The school forest, nursery, and arboretum are easily accessible and afford object lessons which cover a wide range of forestry problems. The proximity of the school to its out-door working field economizes much time which would otherwise be spent on the road.

The biological, chemical, and soil laboratories are adequately equipped with modern appliances and fully stocked with necessary working material.

Numerous collections have been prepared and are available for demonstrating lectures, laboratory work, and special investigations. A herbarium of more than 4,000 specimens of native and exotic woody and herbaceous plants is carefully classified and available for study purposes. A collection of forest tree fruits, seeds, and seedlings is in progress. Typical specimens of wood destroying and parasitic tree fungi are on exhibition in a small museum. Many species of forest insects have been collected and specimens of their work are available for study and demonstration purposes.

In the basement of the main building is a room 16 x 60 feet containing a collection of all the important commercial woods of the United State and some foreign woods. These woods are used in the course in Wood Identification.

A collection of tools, instruments, and machines used in lumbering, silvicultural operations, protective work, and mensuration exercises is in progress. It contains planting hammers, fire torches, fire rakes, brush hooks and other implements designed by Pennsylvania and other American foresters. It also embraces representative European instruments.

The school is adequately equipped with the best and most practical instruments required in the practice of forestry. The surveying equip-

Students Identifying Trees.

Counting and Bundling Seedlings in the Forest Academy Nursery.

An Exercise in Forest Mensuration.

ment is complete and up to date. The forest mensuration equipment comprises the best types of American and representative European calipers, hypsometers, increment borers, xylometers, chains, tapes, and other necessary instruments.

The library comprises all the standard texts on forestry in the English language and many publications in foreign tongues. All the principal forestry periodicals and representative lumber, trade, and technical journals are received regularly and filed systematically for future references.

A large collection of carefully selected charts and photographs covering all phases of forestal activities, is available for use and furnishes the best kind of illustrative material for class work. Lantern slides, covering the major forest operations and typical forest conditions are in stock and are used to illustrate classwork.

For field work in forestry the vicinity of Mont Alto offers unsurpassed facilities. The latitude and topography favor a rich flora. It is the meeting ground of northern and southern species. The northern follow the mountains towards the South and the southern extend northward through the valleys. Within one mile of the school buildings occur more than 100 species of native woody plants and many introduced species. The richness of the local woody and herbaceous flora and its proximity to the school make it possible and practical to give the major part of the instruction in Tree Identification and Systematic Botany in the forest and nearby field without spending an excessive amount of time on the road.

A five-minutes walk from the school brings one to a forest nursery with an annual capacity of 2,000,000 seedlings. It is well equipped with modern nursery appliances, and in it the students learn, not by general observation but by actual work, nursery practice from the preparation and sowing of seed beds to the packing and shipping of seedlings and transplants.

The Mont Alto State Forest has been under careful and businesslike management for the past seventeen years. It is dotted with plantations, experimental sample plots, improvement cuttings, fire towers, and ranger stations, ramified by roads and trails, covered with fire, compartment, and telephone lines, and partly divided into blocks. compartments, and stands. The plantations contain many different species of trees ranging in age from 1 to 19 years and cover an aggregate area of over 600 acres. Improvement cuttings have been made annually since the creation of the forest. A study of the effect of light, medium, and heavy thinnings has been in progress for five years. One steel and two wooden towers have been erected at commanding lookout points. They and the ranger's houses are connected with the forester's headquarters by a state owned metallic circuit telephone system, whose aggregate length is more than 26 miles.

The utilization operations are among the most interesting and instructive on the forest. Fuelwood, posts, and poles are harvested on a large scale. A state-owned portable sawmill, stave mill, shingle mill, and lath mill are operated on the forest. The students, as a part of their course in Lumbering work upon these mills and learn to handle the different positions from felling the trees and firing the boiler to head sawer and timber scaler. Briefly, the students are kept in constant contact with all the operations of a forest business, and are taught the best and most efficient methods of handling a forest property both by precept and practice.

SPECIAL LECTURES.

The faculty arranges annually a course of free lectures. These instructive and helpful talks are given to the students by men of prominence in subjects allied to forestry. They cover travel, history, civics, literature, first aid, wood craft, personal health, and other timely topics.

PURPOSE.

The purpose of the Pennsylvania State Forest Academy is to prepare thoroughly trained foresters for the service of the State in its forests. The duties of a forester in the employ of the State require a thorough training and apprenticeship in actual woods work, besides the usual school studies in forestry, the sciences, and a number of cultural subjects. The forester must have an equipment covering the surveying and mapping of his forest; the growing of trees and their proper management from planting, through thinning, to final logging and sawing; the protection of the forest from its arch-enemy, the forest fire, as well as from insects, disease, and trespass; the building and improvement of the forest roads, trails, fire lines, telephone lines, and the fire towers; the estimation of timber and the calculation of its growth, value, and financial returns; the directing of labor; the keeping of records and accounts; and some knowledge of business and forest law. This requires an underlying training in mathematics, botany, zoology, chemistry, physics, geology, and soils, as well as history, language and economics.

The practical application of this training is the large feature of the school, for the entire course may be said to be given in the 70,000 acres of the Mont Alto and Michaux State Forests in which the school is located. All the activities of the forester are followed in the woods from the growing of trees from seed in the nursery, to the grinding of the forest student's own axe, the cutting of undesirable trees into cordwood, and the mature trees into saw-logs, as well as their manufacture into lumber, lath, staves, and shingles on the school mills; from the day and night fighting of forest fires and the pick and shovel building of roads to the preparation of a thorough working plan for a specified tract of forest land.

But beyond all this technical training, the school aims to develop men who love the forest, for a successful forester must look upon the forest as more than a mere clump or collection of trees. He must see in it a complex community or society of living things and be on a speaking acquaintance with them all. He should know the wild animals, birds, plants, and rocks so well that he finds interest in them. A good forester should not be lonesome in the forest, but instead find continuous contentment in his extensive out-door laboratory.

Last, but not least, the school aims to graduate men who love the people of the forest, if not for what they are, at least for what he hopes they will become. A forester must be a man of parts with whom the people of the forest communities are glad to associate, willing to do ordinary business on a reliable basis, and discuss everyday problems with interest and benefit.

ADMINISTRATION.

The control of the school is vested by legislative enactment in the Commissioner of Forestry. The pedagogical supervision and immediate government is delegated to a Director and school faculty.

FACILITIES FOR RECREATION.

The student body maintains an athletic association. Athletic contests are not engaged in so extensively as at some other educational institutions because the students obtain sufficient physical exercise in their field work which takes them out of doors at frequent intervals during the entire year. A baseball diamond, a double tennis court, a billiard table, and gymnastic equipment are available for use.

Basket-ball is the most popular game. It is especially adapted to a small student body and engaged in during the winter when field trips and forest exercises are few in number and of short duration. The schedule comprises games with normal schools and small colleges.

Hunting and fishing are among the most popular sports. The Mont Alto and Michaux State Forests of 70,000 acres and adjoining forest properties and abandoned fields afford excellent and convenient hunting grounds. Within the forest is a game refuge of 2,000 acres in which wild animals and game birds are propagated systematically. Deer, opossums, raccoons, wood chucks, squirrels, rabbits, pheasants, and quail are plentiful, and wild turkeys and foxes, are occasionally seen. It is not unusual to see a herd of fifteen deer, and occasionally a herd of 25 and in one instance 31 have been observed, In spring time troutfishing offers an enjoyable form of recreation. The nearby mountain streams are numerous and well stocked.

Many points of historic interest are the objectives of week-end walking trips. Among these may be mentioned the Gettysburg and Antietam battlefields, President Buchanan's birthplace, and Pen Mar, a summer resort located on a high mountain at a point crossed by the Mason and Dixon line. Walks to local high points and commanding lookout towers are frequently scheduled. On the Mont Alto forest are one steel and two wooden towers 50 feet in height, affording excellent views of the extensive timbered mountain slopes and the fertile Cumberland Valley, which is surpassed in Pennsylvania only by the Lancaster Valley in its agricultural capacity.

FOREST CLUB.

The Rothrock Forest Club is a student organization named in honor of Dr. J. T. Rothrock, the founder of the school and for many years the leader of the forestry movement in Pennsylvania, and in the United States. The meetings are held in Log Lodge, a commodious log building finished in southern yellow pine and heated by a spacious fire-place. The program of the meetings is similar to that of literary societies at other educational institutions. The club is also the agency through which the students are introduced to prominent men in forestry and other professions.

SCHOOL YEAR.

The school year is divided into the first and second terms and the summer session. The first term begins on the first Tuesday of September and extends to the latter part of January. The second term begins the last week in January and extends to the middle of June. The summer session begins immediately upon the termination of the second term and extends to the early part of August, when a four weeks recess begins.

A two weeks recess during the Christmas Holidays is provided each year. Four weeks in April and May are devoted entirely to planting and nursery work. The school year thus covers 46 weeks. This is a considerably heavier course than is given in any other four-year forestry school in the United States.

REQUIREMENTS FOR ADMISSION.

The general requirements for entrance to this school are as follows:

1. Applicants for admission to the Freshman class must be at least 17 years of age and must submit to the Director of the School proper testimonials of a good moral character.
2. Every applicant for admission shall have completed a 4 year High School course or satisfactory equivalent.
3. Students desiring to enter with advanced standing must present properly signed certificates from other colleges covering the subjects pursued at such institutions.
4. Students must enter at the beginning of the fall term and not later than September 19, 1922, unless they have advanced standing to cover the work done by the classes they wish to enter.

SPECIFIC SCHOLARSHIP REQUIREMENTS:

The scholarship required of all applicants for entrance to the Freshman class is evidence of thorough preparation in fifteen units of High School work or its equivalent. A unit of High School work is the amount of work represented by five recitations a week for a school year of at least eight months or a minimum of 160 hours of recitation work or equivalent laboratory work.

The required units for entrance to the Freshman class are as follows:

English	3 Units
Mathematics (Elem. Algebra, Plane Geometry Advanced Alegebra, Solid Geometry	3 Units
Science (Botany, Physics, Chemistry, Physical Geography; etc.,)	1 Unit
History	1 Unit
	8

The elective units to make up a total of 15 should be selected from the following subjects:

- English
- Language, other than English
- Mathematics.
- History.
- Science.
- Civics.
- Vocational Subjects.

The number of units to be allowed will be determined by the Director of the Academy. If students do not maintain the scholarship standards of the school, they will be dropped.

Application Forms:

Each applicant is required to submit a properly executed application for admission. Application form may be obtained from the Director, State Forest Academy, Mont Alto, Franklin County, Pa.

State Scholarships:

The State Department of Forestry offers not to exceed ten four-year scholarships annually. The candidates for these scholarships must be "Citizens of Pennsylvania, not less than 17 or more than 25 years of age on the first day of September of the year of entrance, must be physically sound as shown by physical examination and must take a mental examination in Scholarship which covers the following branches: English (Grammar, Composition and Rhetoric); United States History; Civil Government; Arithmetic with special emphasis on Mensuration, Interest, Proportion, and Progression; Algebra (complete High School Algebra); Plane Geometry, and Biology (including Human Physiology)".

The examinations for 1922 will be held on June 22 and 23 at Harrisburg. Candidates will report at the Department of Forestry, Capitol Building, 9 to 12 A. M. June 22.

The mental examination will begin at 1:30 p. m. June 22 and will be completed June 23 by 2:00 p. m. The examination is held by a selected committee of high school teachers who correct and grade the papers.

The highest ten men who pass the examinations are assigned to certain State forests for six weeks practical work beginning July 1 for instruction and observation, during which their attitude toward and their fitness for the work of a forester is determined. Those who prove satisfactory in this work will be offered the scholarships by the Commissioner of Forestry. During this field-test applicants will pay transportation charge to and from the forest to which they are assigned and the Department will pay their board and lodging. Camping may be required.

Conditions of Scholarships:

After appointment each scholarship student must furnish bond of $500 that he will complete the four year course and remain in the State Forest Service, in case his services are needed, for three years at such salary as the department may reasonably offer. On its part the State Department of Forestry contracts to provide the student, free of charge, the following for the four year course: tuition, board, room, heat, light, stationery and plain washing.

Estimated Minimum Expenses Per Year:

	Non-scholarship students.		Scholarship students.
	Penna.	Outside State	
Tuition	Free	$150	Free
Board, 46 weeks @ $5½	$253	253	"
Room, furnished, heat, light, 46 weeks, @ $2	92	92	"
Books and Instruments	35	35	$35
Laundry, 46 weeks @ .50	23	23	Free
Forestry Club, Athletic & Social	25	25	25
Expenses on field & Inspection trips	10	10	10
Deposit-Breakage	5	5	5

Clothing, personal and travelling expenses are impossible to generalize.

Students using school laundry will provide themselves with red woven laundry marks giving full name. (Order before entering from Book-Room, Forest Academy).

Deposit:

When a student enters the Academy he must make a deposit of $5 with the Director, against which will be charged all items of unnecessary, careless, or wilful breakage or damage to State property. Whenever deposit is lowered by reason of charges against it, the student will be required to increase the deposit at the beginning of each school year to the full amount of $5. At the time of graduation there will be returned to him whatever balance may remain to his credit.

Degree:

For the satisfactory completion of the full four years course as prescribed, the degree of Bachelor of Forestry is conferred.

COURSE OF STUDY.

Freshman Year.

First Term.			Second Term.		
Number of course.	Subject.	Credit hours.	Number of course.	Subject.	Credit hours.
11	Botany	4	12	Botany	4
18	Chemistry	3	19	Chemistry	3
F 1	Elementary Forestry	2	22	Drawing	1
1	English	3	F 2	Elementary Forestry	2
34	German or French	2	35	German or French	2
21	Mathematics	4	2	English	3
27	Trucks & Mechanics	2	23	Plane Surveying	1
			29	Physics	3
			28	Shop	1

Summer Session.

13	Botany	2
F 6	Silviculture	2
F 3	Forest Mensuration	2

Sophomore Year.

	First Term.			Second Term.	
14	Botany	2	F 10	Dendrology	3
20	Chemistry	2	4	English	3
3	English	3	37	German or French	2
32	Geology	3	31	Meteorology	2
36	German or French	2	33	Soils	3
38	(Elect) Pa. History	1	25	Surveying	2
30	Physics	3	15	Zoology	3
24	Surveying	4	F 4	Forest Mensuration	2

Summer Session.

F 11	Dendrology	1
F 5	Forest Mensuration	2
26	Forest Map	3

Junior Year.

	First Term.			Second Term.	
5	Accounting	1	8	Business Law	2
F 12	Dendrology	2	F 18	Forestry History	2
F 19	Forest Engineering	3	F 14	Forest Pathology	3
F 13	“ Entomology	3	6	General Economics	4
F 15	“ Protection	2	F 22	Lumbering	4
F 20	Mech. Properties wood.	2	F 8	Silviculture	3
F 7	Silviculture	3	F 21	Wood Identification	1
17	Wood Morphology	2			
16	Zoology	2			

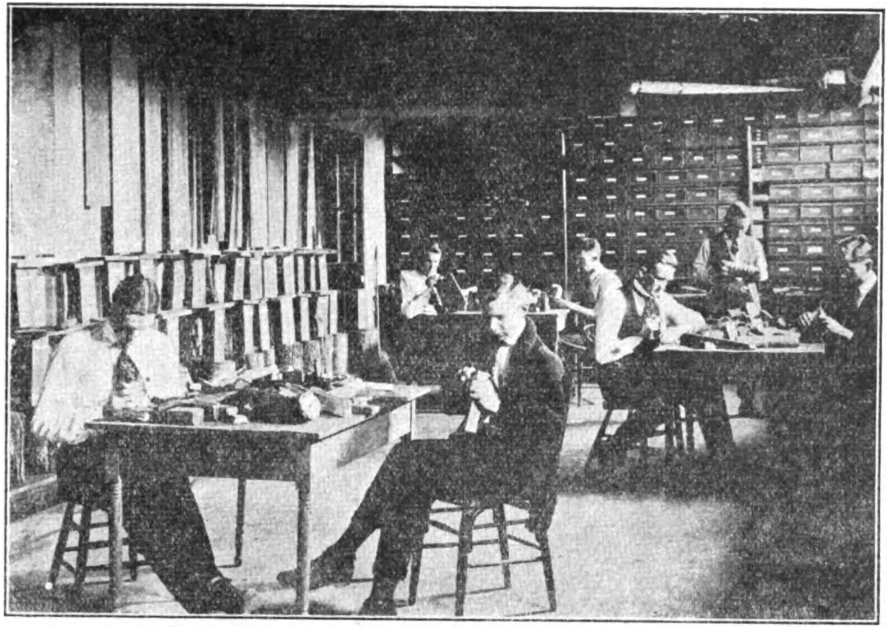
Summer Camp.

F 23	Logging & Milling	4

Senior Year.

	First Term.			Second Term.	
F 25	Forest Economics & Policy	3	10	Fish Propagation	2
F 26	Forest Finance	4	F 29	Forest Administration	3
F 16	Forest Regulation	3	F 28	“ Appraisal	3
9	Game Propagation	2	F 27	“ Laws	3
7	General Economics	2	F 17	“ Organization & Working Plans	4
F 9	Silviculture	3	F 31	Seminar	1
F 24	Wood Utilization	4	F 32	Thesis	5
F 30	Seminar				

A Forest Surveying Crew.



Students Identifying Wood.

DESCRIPTION OF COURSES.

F 1. ELEMENTARY FORESTRY.

2 Credit Hours. *First Term, Freshman Year.*

A course to give the student a broad introduction to all phases of work in forestry, and of the relation of forestry to other sciences and to the nation's economic life. Text work and field trips in state forest are required. Moon & Brown's *Elements of Forestry* is used as text.

F 2. ELEMENTARY FORESTRY.

2 Credit Hours. *Second Term, Freshman Year.*

The course aims to give the student a through knowledge of the distribution of Forests in the United States and the development of the forestry idea in United States and in Pennsylvania.

F 3. FOREST MENSURATION.

2 Credit Hours. *Summer Session, Freshman Year.*

Introduction to the subject; lectures and field work on the measurement of felled trees in various units.

F 4. FOREST MENSURATION.

1 Credit Hour. *First Term, Sophomore Year*

The course aims to give the student a through knowledge of methods used in measuring volumes of single trees, either felled or standing, and of the determination of growth and yield. Graves' *Forest Mensuration* is used as text.

F 5. FOREST MENSURATION.

2 Credit Hours. *Summer Session, Freshman Year.*

This course consists of field work in measuring stands of timber, and study of growth and yield of stands, especially in collecting data for a working plan

Estimating Timber.

Students Measuring Tree Height with Instruments.

F 6. SILVICULTURE & NURSERY PRACTICUM.

2 Credit Hours. *Summer Session, Freshman Year.*

Operations on the Mont Alto State Forest of 23,000 acres permit students from time to time throughout their course, to take part in practical improvement, liberation and reproduction cuttings, cleaning and protection of the extensive plantation areas; but these activities, together with planting, serve especially to introduce future foresters to actual silviculture in the woods. The nearby state forest nursery of eleven acres under intensive cultivation produces annually 2,000,000 trees for reforestation work. Students take an important part in soil preparation, seed sowing, transplanting, cultural and protective measures, together with lifting, grading and packing trees for transportation. An instructor and skilled workmen are always present to make this work instructive as well as practical.

F 7. SILVICULTURE, (SILVICS OR FOREST ECOLOGY, AND FOREST GEOGRAPHY).

2 Credit Hours. *First Term, Junior Year.*

The primary effects of heat, light, wind, moisture and soil upon tree growth and distribution are thoroughly discussed; followed by the effects of forests on climate and soil, the internal struggle of the stand, site quality assessment, stand description and forest types. Application of the basic fact of silvics and dendrology to the actual forest is made in a series of lectures in forest geography and physicgraphy; embracing a detailed study of the forest regions and types of the United States and Canada, with a general survey and discussion of the important forested areas of the world noting in particular their structure, ecology and possibility of economic development. Many references are used and abstracts required of each student. Considerable material given in the course is derived from Schlichs *Sliviculture*, Mayr's *Waldbau, and* Bowman's *Forest Physiology.*

F 8. SILVICULTURE. (SEEDING AND PLANTING).

3 Credit Hours *Second Term, Junior Year.*

Seed production, collection, extraction and storage, nursery work and administration. Direct seeding and plantation establishment. Reforestation problems and progress are studied in the field and a planting plan prepared for a definite area of denuded land. Under trained and skilled supervision, students follow the trees through each stage of nursery practice, from staking out beds to final shipment or planting in the forest. Problems in nursery management, technique and protection are discussed in detail. Students participate in various experimental work which is always under way, and are given experience in directing work in nursery and planting operations. Costs are calculated for work done and stock produced; inventories are made; nursery accounting and plantation report forms are explained and used. Toumey's *Seeding and Planting* is text used with supplementary notes from other sources.

Finding the Age of a Tree.

Measuring Height Growth of Scotch Pines.

F 9. SILVICULTURE. (SYSTEMS OF NATURAL REGENERATION).

3 Credit Hours *First Term, Senior Year.*

Critical comparisons are made between pure and mixed woods, high and low forest forms; natural and artificial regeneration; the silvicultural systems; methods of thinning, forest conversion and improvement. Cleanings, liberation and damage cuttings, and treatment of wood-lots are considered from an experimental as well as theoretical and empirical standpoint. The location of the school here where the South Mountains, managed for a century prior to their acquisition by the state for continuous yields of charcoal for the iron industry, adjoins an extensive agricultural area with scattered farm wood-lots, give it a vast natural outdoor laboratory for silvicultural instruction. This has been improved during the past twenty years by the establishment of more than 600 acres of plantations of many species and upon a variety of sites. Hawley's *Silviculture* and Graves' *Principles of Handling Woodlands* are the texts used, with Schilch's *Silviculture*, Mayr's *Waldbau* and *Traite Pratique de Silviculture by* Jolyet as chief reference works.

F 10. DENDROLOGY.

3 Credit Hours *Second Term, Sophomore Year.*

A systematic and biological study of the trees of the United States and introduced species, stressing the important timber producers. Special attention is given coniferous species native to temperate climates similar to that of Pennsylvania. Form, distinguishing characteristics, reproduction, occurrence and range are taken up in detail. In the first semester tree identification in the field is begun by a series of brief trips and a collection of winter buds, mounted on cards and representing 150 species, as required. Keys are worked out by the students for both winter and summer use. About 100 important trees of the locality are observed thru-out the year by assigned students and phenological data recorded. The growing school collection of photos, slides, herbarium mounts and other dried material of the important forest species adds interest to lecture room instruction. In addition to numerous references, texts especially followed are: Illick's *Pennsylvania Trees;* Sargent's *Manual of Trees of North America;* Hough's *Handbook of Trees of Northeastern United States and Canada;* Mayr's *Fremlandische Wald- und Park baume fur Europe;* publications of the U. S. Forest Service, by Geo. B. Sudworth and others.

F 11. DENDROLOGY. (TREE IDENTIFICATION).

1 Credit Hour *Summer Session, Sophomore Year.*

A field course embracing the study of all woody vegetation in the vicinity of Mont Alto, where more than 150 species of trees and shrubs are native within a radius of ten miles. Including exotics, students are familiarized with about 250 species. The Forest Academy is so located that it lies within the ranges of many northern and southern trees which overlap here, and this naturally advantageous site has been supplemented by an arboretum, containing the more important forest trees of the Western U. S. and temperate foreign countries. In addition to many half days spent in adjacent forest and fields, during the course all-day field-trips are made to the Potomac River, North Mountains, Pen Mar and several localities in the fertile and historic Cumberland Valley, permitting the study of trees under widely varying conditions of growth and habitat. Field tests cover 800 to 900 specimens. Tests used are Illick's *Pennsylvania Trees* and *Checklist of Trees of Franklin County.*

F 12. DENDROLOGY.

3 Credit Hours. *First Term, Junior Year.*

Continuation of course (F 10.)

F 13. FOREST ENTOMOLOGY.

3 Credit Hours *First Term, Junior Year.*

A general discussion of the morphology, physiology, development and classification of insects; the life history of both beneficial and injurious species, with special reference to those forms which are of economic importance in the forest. Sanderson and Jackson's *Elementary Entomology* is the text used, supplemented by reference to various State and National bulletins on insects of economic importance.

F 14. BOTANY, FOREST PATHOLOGY.

3 Credit Hours *Second Term, Junior Year.*

A course considering representative tree diseases caused by cryptogamic parasites and saprophytes and parisitic flowering plants. Preventive and remedial measures for checking their damage are discussed. Class and laboratory are supplemented by field exercises. Rankin's *Tree Diseases* is the text used.

F 15. FOREST PROTECTION.

2 Credit Hours *First Term, Junior Year.*

Lectures and reference reading covering a complete discussion of general forest protection with special detailed discussion of protection against fire. Special reference is made to Pennsylvania conditions and actual field work in forest protection is included in the course as part of the school work. All students are enrolled in organized fire crews and take part in the extinction of forest fires on the Mont Alto and Michaux Forests.

F 16. FOREST REGULATION.

3 Credit Hours *First Term, Senior Year.*

The broad and general principles of forest management are first considered. Every effort thru-out the course is directed toward the practical correlation and application of facts, data and rules derived in other scientific and forestry courses. A proper and clear concept of the normal or ideal forest with continuous yield and other attributes, is held before the student until every phase is firmly grasped. The fundamentals of increment, growing stock and age classes are studied in detail; then follows the drafting of formulation of felling budgets and solution of problems that arise in the effort to attain normality upon forest areas with given conditions. Critical studies are made of the various formulae and methods whereby an approximation to the normal forest may be achieved. Texts used are Roth's *Forest Regulation* and Recknagel's *Theory and Practice of Forest Working Plans.*

F 17. FOREST ORGANIZATION AND WORKING PLANS.

4 Credit Hours *Second Term, Senior Year.*

This course is a continuation of that in Forest Regulation but embodies more field work and takes up geometric, quantitative and qualitative surveys of a specific forest area, with the theory and practice of forest subdivision and stand differentiation. A portion of a State Forest is annually taken up and divided into permanent compartments for silvicultural and administrative purposes. Careful stock surveys, made in conjunction with the sophomore class in mensuration, furnish a basis for the creation of more or less temporary sub-compartments, coextensive with some definite and important stand condition, such as age, species, density, site or future silvicultural treatment. The compartment lines are demarcated upon the ground, while the lines of sub-compartments usually are not. Working plan reports and maps are required of each student, and all necessary facilities for efficient work toward this end, such as transportation and technical instruments, are furnished by the school or forest officers. References used include Schlich's *Forest Management*, Kaiser's *Einteilung der Forsten* and Wagner's *Grundlagen der raumlichen Ordnung im Walde.*

F 18. FOREST HISTORY.

2 Credit Hours *Second Term, Junior Year.*

A course giving more or less detailed information as to development of forest property, forest conditions, forest investigation, and handling of forest properties for timber production in the principal countries of the world. Special attention is given to development of forestry in Pennsylvania. Fernow's *History of Forestry* is used as a text.

F 19. FOREST ENGINEERING.

3 Credit Hours — *First Term, Junior Year.*

Principles of forest roads, practical survey and construction. Construction of trails, bridges, telephone lines, fire towers.

Logging railroads, grades and curves.

Finding the flow of springs and streams.

Roads text—*Highway Engineering—Chatburn.*

F 20. MECHANICAL PROPERTIES OF WOOD.

2 Credit Hours — *First Term, Junior Year.*

This course aims to acquaint the student with the physical properties of wood, the factors that affect them, and the methods giving these properties actual values through timber testing. Record's *Mechanical Properties of Wood* is used as text.

F 21. WOOD IDENTIFICATION.

1 Credit Hour. — *Second Term, Junior Year.*

A detailed study of the methods used and practice on actual specimens of the various important commercial woods of the United States.

F 22. LUMBERING.

4 Credit Hours — *Second Term, Junior Year.*

This course aims to show in detail how the products of the forests are harvested, and prepared for the market. It includes actual work in the woods and in the manufacture, in a state owned plant, of lumber shingles, lath, ties, etc. The text in use is Bryant's *Logging.*

F 23. LOGGING AND MILLING.

4 Credit Hours — *Summer Session, Junior Year.*

This course includes a 6-8 weeks trip to a large saw-mill operation and includes a study of methods, costs, etc., from stump to car and a detailed report on the same.

F 24. WOOD UTILIZATION.

4 Credit Hours — *First Term, Senior Year.*

This course includes a study of the industries that further manufacture the timber and other rough materials removed from the forest in lumbering operations. It includes a study of the wood using industries of Pennsylvania. The texts used are Brown's "*Forest Products*" and *Wood Using Industries of Pennsylvania* (Dept. Bulletin No. 9).

A Lesson in Saw Filing.

Students Making Chestnut Shingles.

F 25. FOREST ECONOMICS AND POLICY.

3 Credit Hours *First Term, Senior Year*

A study of the social utilities flowing from forests and the importance of forests and forest products in industry. The continuing depletion of our forests; the possibilities for continuous production. The policy of nations, states and municipalities toward forest propagation. Government ownership, control and cooperative policies.

Lectures.

F 26. FOREST FINANCE.

4 Credit Hours *First Term, Senior Year.*

Forest property from the investment point of view. Calculation involving principles of compound interest and annual charges: Interest rate; net income; financial maturity; carrying charges; methods of comparing financial results under different methods of treatment: forestry compared with agriculture; forest taxation. References, Roth's *Forest Valuation* and Chapman's *Forest Valuation.*

F 27. FOREST LAWS.

3 Credit Hours *Second Term, Senior Year.*

A brief review of the Forest Laws in the U. S. Texts, Kinney on *Forest and Timber Law.*

Supplemented by a course of lectures on the powers of forest officers as peace officers.

F 28. FOREST APPRAISAL.

3 Credit Hours *Second Term, Senior Year.*

The valuation of forest properties; determination of stumpage values; assessment of forest damage. Lectures.

F 29. FOREST ADMINISTRATION.

3 Credit Hours *Second Term, Senior Year.*

This course aims to acquaint the student with the principles used in the organization of the business administration and personnel to care for forest property. The present status and methods used in the State Forests, National Forests and Private Forests will be discussed. Lectures and reading.

F 30. SEMINAR.

1 Credit Hour *First and Second Term, Senior Year.*

A round table discussion of professional forestry movements, events and literature. Includes preparation of papers, reviews and, leading discussions.

F 31. THESIS.

5 Credit Hours *Last 6 weeks, Senior Year, Second Term.*

Each student will make a special field study of a subject approved at the end of the Junior year. These subjects will generally fall under the heads of transportation, seasoning, preservation, or price studies of lumber; timber accounting; special product studies; silvicultural or management investigations, etc.

1. ENGLISH.

3 Credit Hours *First Term, Freshman Year.*

This course includes a review of the essentials of English grammar, the rules for capitalization, punctuation, and business correspondence. Themes on pertinent subjects are required frequently. "*English Composition in Theory and Practice*" by Canby and others is the text used. "*Wooley's Handbook of Composition*" is used for reference.

2. ENGLISH.

3 Credit Hours *Second Term, Freshman Year.*

The whole field of prose and poetical composition is studied in general and detail from the standpoint of the three underlying principles governing all good composition, unity, coherence, and emphasis. Themes and other exercises illustrating these principles are required. The mechanics of writing are continued as in English 1. Representative classics are read.

3. ENGLISH.

3 Credit Hours *First Term, Sophomore Year.*

A brief review of world literature as a whole, followed by a summary of English and Amercian literature with particular attention given to the study of the scientific writings of such authors as Roosevelt, Muir, Burroughs, Thoreau, and Fabre.

4. ENGLISH.

3 Credit Hours: *Second Term, Sophomore Year.*

A continuation of English 3 with emphasis upon the encouragement of the student to put his English into effective, practical use by exercises in debating, public speaking, and parliamentary practice. Themes.

5. ACCOUNTING.

1 Credit Hour *Junior Year, First Term.*

Principles of accounting: Single and double entry procedure: Different kinds of accounts: Depreciation budgets: Accounting as applied to forest finances and records: Pennsylvania Dept. of Forestry prescribed accounts. Use of checks, drafts, notes, mortgages.

6. ECONOMICS.

4 Credit Hours *Second Term, Junior Year.*

Principles of economics, Capital; Labor; Business Organization; Money and Banking; Monopoly; Transportation. Taussig's *Principles of Economics Vols. 1 & 2.*

7. ECONOMICS.

2 Credit Hours *First Term, Senior Year.*

Continuation of Economics 1, followed by a study of Taxation and Public revenue.

8. BUSINESS LAW.

2 Credit Hours *Junior Year, Second Term.*

An elementary study of Elements of Business Law with special reference to contracts, and property. Huffcut's *The Elements of Business Law,* is the text used.

9. GAME PROPAGATION.

2 Credit Hours *First Term, Senior Year.*

Course of lectures by Specialist from Game Commission. A state game preserve located on the school forest is a valuable object lesson in game propagation. The school forest now contains hundreds of deer and much smaller game.

10. FISH PROPAGATION.

2 Credit Hours. *Second Term, Senior Year.*

Course of lectures by Specialist from the Fish Commission.

11. BOTANY.

4 Credit Hours *First Term, Freshman Year.*

Morphology of the Spermatophytes.

A course specially adapted to the early and fundamental training of the forester. It comprises a study of the external and internal morphology and physiology of the six primary parts of the seed bearing plants. Tree material is used where possible to illustrate the different parts of the plant system. Part 1 of Ganong's "*A Text-book of Botany for Colleges*" is used.

12. BOTANY.

4 Credit Hours *Second Term, Freshman Year.*

Evolution of the Plant Kingdom.

A careful study of the morphology of representative examples among the algae, fungi, liverworts, mosses, ferns, gymnosperms and angiosperms is pursued in the laboratory and in the field. Special attention is given to the alternation of generations in the plants studied and in working out their life histories, the progression and retrogression of certain organs and phases in proceeding from the lower to the higher plants are noted. Field trips are made once a week to enable the student to collect and study the plants in their natural habitats. Part 2 of Ganong's *A Text-book of Botany for Colleges* is used.

13. BOTANY.

2 Credit Hours — *Summer Session, Freshman Year.*

Taxonomy.

A comparative study is made in the field of the families of plant groups and special training is given in the methods of collection and preservation of material. Each student is required to make an herbarium of at least 125 species of herbaceous plants and to learn common and scientific names of at least 180 plants. Emphasis is laid on the key for indentification of the plants. Gray's *New Manual of Botany* and Britton and Brown's *Illustrated Flora of the Northern States and Canada* are the text and reference used.

14. BOTANY.

2 Credit Hours. — *First Term, Sophomore Year.*

Plant Ecology.

The course deals with the relation of plants to their environment. First, there is a study of the ecological factors, which in general are grouped under physical, climatic and biotic factors. This is followed by a discussion of succession, the struggle for existence among plants, the laws of migration, the analysis of vegetation forms and structures, plant formations and societies.

In the laboratory different members of the plant are studied as to their special functions and their relation to environment. The stem, root, leaf, flower, etc., are carefully examined and their ecological relations pointed out.

The Forest Academy is very favorably located for the field study of Plant Ecology, as a great variety of plant life conditions may be found in the immediate vicinity of the school. Therefore, students are able to work in the adjoining fields and forests, which is a decided advantage over the studying of plant life processes in the laboratory.

15. ZOOLOGY.

3 Credit Hours. — *Second Term, Sophomore Year.*

General Zoology.

In this course a general survey is made of the animal kingdom from the Protozoa to the Chordata. In the laboratory each student dissects an animal typical of each phylum and makes drawings of the parts observed. Hegner's *College Zoology* is the text used.

16. ZOOLOGY.

2 Credit Hours. *First Term, Junior Year.*

A review of cordata including Mammals and birds indigenous to Penna.

17. BOTANY.

2 Credit Hours. *First Term, Junior Year.*

Wood Morphology.

A study of the microscopic structural features of wood. Representative type specimens of the conifers and broad leaved trees are studied in detail with compound miscroscopes in order to determine the occurance, form and structure of the wood elements. All structural features which are of value in distinguishing the different woods are studied under the simple and compound microscope from cross, radial and tangential sections of the different woods. Record's *Identification of the Economic Woods of the United States* and Jeffrey's *The Anatomy of Woody Plants* are used as texts and references.

18. CHEMISTRY.

3 Credit Hours. *First Term, Freshmen Year*

This course comprises a study of the metals and non-metals. Lectures and recitations are correlated with laboratory experiments to illustrate fundamental facts and general principles. The acquisition of a chemical vocabulary and of initiative and skill in making observations receives special emphasis. Kahlenberg's *Outline of Chemistry* is used.

19. CHEMISTRY.

3 Credit Hours. *Second Term, Freshman Year.*

The main outlines and general methods of qualitative and quantitative analysis are studied. Stress is laid upon the development of accuracy and efficiency in method and technique, rather than upon the mere acquisition of facts.

20. CHEMISTRY.

2 Credit Hours. *First Term, Sophomore Year.*

The general outlines of organic chemistry as a whole are first studied. Then the methods of deriving and manufacturing the chemical products of forest origin are presented. Reports to the class on special subjects assigned for experiment or investigation are required from time to time. Hart's *Organic Chemistry* is the text used. The reading of Slosson's *Creative Chemistry* is required.

21. TRIGONOMETRY.

4 Credit Hours, *First Term, Freshman Year.*

The course covers trigonometric analysis, right and oblique triangles, and the use of logarithms and tables. Special stress is laid upon the solution of practical problems with accuracy and speed. Right, quadrantal and oblique sperical triangles are covered briefly, emphasizing the practical application of spherical trigonometry. Philips and Strong's *Elements of Trigonometry* is followed as a text, but problems and illustrations from other authorities are frequently taken up in class and special assignment.

22. DRAWING.

1 *Credit Hour.* *Second Term, Freshman Year.*

The use of drawing instruments. Lettering. Tracing. Blueprinting.

Projections. Drawing of simple construction.

The plotting of compass surveys in coordination with Surveying.

23. PLANE SURVEYING.

1 *Credit Hour.* *Second Term, Freshman Year.*

An elementary course intended to clear the way for advance surveying and improve the students sense of position and direction in the woods. It gives the student a better grounding for sample plots, strip surveys, timber cruising and the use of mensuration instruments in the summer term, and second year course in Forest Mensuration. Linear measurement-pacing, chain, tape: compass surveying— — — latitudes and departures, error of closure and area calculation: Simple traverse-board sketching: Use of aneroid: Use of Abney level.

24. PLANE SURVEYING.

3 *Credit Hours.* *First Term, Sophomore Year.*

Advanced work. *The engineers transit*—traverses by direct angle, deflection angle, azimuth methods: Stadia surveying: Meridian determination: Gradienter attachment for road grades: Trigonometric levelling: Transit for spirit levelling:

The Wye level—in precise levelling, differential levelling, setting stakes to grade for road, drain and construction work.

Plane table with telescopic alidade, three point determination, the making of a plane table map.

Testing and adjustment of instruments. Plotting of field notes, maps and profiles.

25. TOPOGRAPHIC SURVEYING.

2 *Credit Hours.* *Second Term, Sophmore Year.*

(a) Rough rapid survey, compass, pacing, aneroid: Principal of contours.

(b) Accurate mapping. Triangulation-base line measurement; determination of angles with methods of repetition and series: Correllation of different instruments for different parts of a survey.

26. FOREST MAP.

2 Credit Hours. *Summer Session, Sophomore Year.*

The consruction of a contour map of 2500 acres of mountain land—field work—drafting—tracing and blue printing. Practice for Surveying 25.

27. TRUCKS AND MECHANICS.

2 Credit Hours *First Term, Freshman Year.*

This course aims to give the student a practical working knowledge of automobile and truck driving and maintenance through work in class room, garage, and on the road. Steam Engine, sawmill equipment, and telephone work, such as might be encountered in the forest are taken up. Frazer & Jones' *Motor Vehicles and their Engines* is used as reference.

28. SHOP.

1 Credit Hour *Second Term, Freshman Year.*

This course aims to give the student a working knowledge of the tools used in rough construction of wood and metal. Active Shop work in making of tenons and joints for wood work, and of important phases of black-smithing will be covered. A large well lighted workshop, well equipped with the necessary tools will be used for instruction.

29. PHYSICS.

3 Credit Hours *Second Term, Freshman Year.*

This course includes a study by observation and experiment of the principal phenomena of matter and energy together with an application of general principles to the solution of forest problems. Kimball's *College Physics* is the text used.

30. PHYSICS.

3 Credit Hours *First Term, Sophomore Year.*

Continuation of course 29.

31. METEOROLOGY.

2 Credit Hours *First Term, Sophomore Year.*

This course introduces the student to scientific methods used in determination of the various climatic factors and their relation to weather changes. United States weather maps are received daily and methods of forecasting explained. Milham's *Meteorology* is used as text.

32. GEOLOGY.

3 Credit Hours *First Term, Sophomore Year.*

A course designed to give an introduction to general geologic principles. Attention is paid particularly to the dynamical, structural, and historical geology of Pennsylvania with reference to the processes involved in the development of the present topographic and the soil provinces of the state. Field excursions based on the use of topographic maps are made from time to time. Chamberlain and Salisbury's *College Geology* is used.

33. SOILS.

3 Credit Hours *First Term, Sophomore Year.*

This course aims to develop by observation and experiment the principles governing the properties and management of field and forest soils.˙ Field work is required to illustrate soil survey methods, and to harmonize theory with practice in application of the conclusions derived from laboratory experiments. Students are requried to report on the analysis of one soil sample brought from a typical locality near their homes. *Soils* by Lyon, Fippin, and Buckman is the text used.

34. GERMAN.

2 Credit Hours *First Term, Freshman Year.*

A course comprising a careful drill in pronunciation and the principles of German Grammar. Selected German texts and Thomas' *Practical German* Grammar are used.

35. GERMAN.

2 Credit Hours *Second Term, Freshman Year.*

Continuation of (34) German with selected texts.

36. GERMAN.

2 Credit Hours *First Term, Sophomore Year.*

Course in Scientific German, Gore's *German Science Reader* and selected texts.

37. GERMAN.

2 Credit Hours *Second Term, Sophomore Year.*

Continuation of preceding course with selected forestry texts Hausrath's *Der Deutsche Wald* is the first text used.

Class of 1921.

Name.	*Residence.*
Bradley, Tom Oswald,	Mercersburg, Pa.
Brouse, Edgar Frederick,	Boalsburg, Pa.
Clepper, Henry Edward,	542 Locust St., Columbia, Pa.
Houpt, Richard Ritchey,	Mercersburg, Pa.
Kreamer, George Parfeit,	574 Carey Ave., Wilkes-Barre, Pa.
Kutz, Donald Bentley,	231 Franklin St., Reading, Pa.
Lefkof, Emil Alfred,	422 N. Main St., Wilkes-Barre, Pa.
Mosch, Walter Fred,	Coudersport, Pa.
Nicholas, Herbert Murray,	538 E. Market St., York, Pa.
Shaw, Thomas Edward,	207 W. 7th St., Chester, Pa.
Swingler, William Sherman,	544 Cherry St., Columbia, Pa.
Shirey, Thaddeus Irwin,	212 S. 16th St., Reading, Pa.
Taber, William Stone,	725 Wilson St., Williamsport, Pa.

Class of 1922.

August, William A.,	1223 E. Pine St., Mahonoy City, Pa.
Frontz, Leroy,	Allenwood, Pa.
Lott, Hugh Carlin,	Springville, Pa.
Shulley, Frederick,	1650 Muhlenberg St., Reading, Pa.
Somers, Gayle Hamilton,	Renton, Pa.
Stott, Calvin Brill,	1608 Perkiomen St., Reading, Pa.
Yehl, Richard Kuhns,	1531 Hanover Ave., Allentown, Pa.

Class of 1924. (Four Year Course)

Dunmire, Daniel Edward,	240 Unity St., Greensburg, Pa.
Feuchsel, Charles F.,	5213 Baltimore Ave., Phila., Pa.
Genaux, Charles M.,	Shinglehouse, Pa.
Geltz, Charles G.,	810 Ridge Ave., McKeesport, Pa.
Holtz, Irenus B.,	Ashville, Pa.
Moll, Wilford P.,	East Greenville, Pa.
Norris, Thomas G.,	Philipsburg, Pa.
Schaeffer, Charles H.,	419 W. King St., Lancaster, Pa.
Schlatter, Ernest J.,	Tunkhannock, Pa.
Schoen, Paul W.,	1127 Division St., Scranton, Pa.

Class of 1925.

Anderson, Hartley Kirtland,	4630 5th Ave., Pittsburgh, Pa.
Bowlby, Irving Stickles,	324 S. River St., Wilkes-Barre, Pa.
Carnegie, William,	1569 Earl St., Wilkinsburg, Pa.
Eby, Harry G.,	Washington St., Chambersburg, Pa.
Forsythe, Howard Yost,	213 Lockhart St., Sayre, Pa.
Frampton, Samuel R.,	1127 East St., Wilkinsburg, Pa.
Feeman, Abraham,	109 Canal St., Lebanon, Pa.

Hughes, Charles Collins, ...Collegeville, Pa.
Kerns, Chester Merrill, ...220 Allegheny St., Jersey Shore, Pa.
Le Duc, Edmond, ...Mont Alto, Pa.
McNees, Wayne Anthony, ...616 9th Ave., New Brighton, Pa.
Nixon, Robert Brighton, ...2160 N. 19th St., Philadelphia, Pa.
Pardoe, Homer W., ...532 Market St., Williamsport, Pa.
Sebring, Harold Martin, ...62 S. Sherman Ave. Allentown, Pa.
Smith, Harry Frederick, ...416 Main St., Kingston, Pa.
Smith, Ralph Wilson, ...8 Stout St., Pittston, Pa.
Sipe, Francis Henry, ...Somerset, Pa.
Somers, Frances Wilkinson, ...Renton, Pa.
Stauffer, Jacob Martin, ...43 S. 5th Ave., Coatesville, Pa.
Wilcox, Ralph F., ...New Albany, Pa.
Wood, Cyrus G. ....Mont Alto, Pa.
Woods, Ignatius Leroy, ...Marienville, Pa.

GUIDE TO FORESTRY

BOOK ONE

BY

JOSEPH S. ILLICK

Bulletin 26

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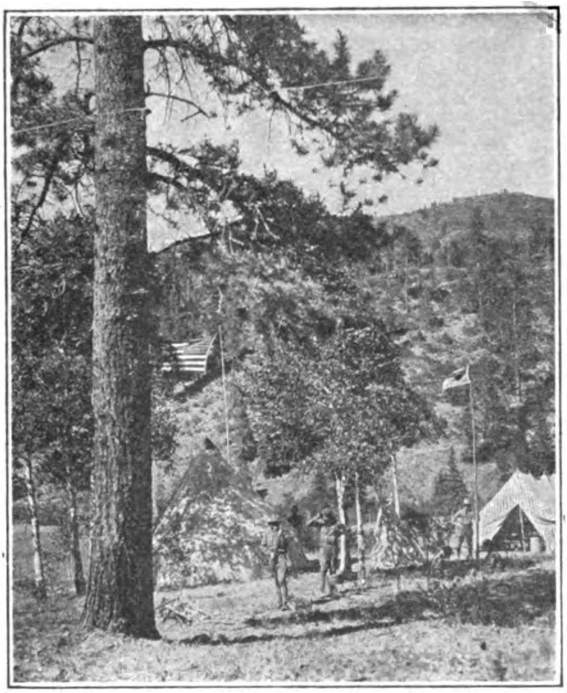

PENNSYLVANIA DEPARTMENT OF FORESTRY

R. Y. Stuart, Commissioner.

GUIDE TO FORESTRY

BOOK ONE

BY

JOSEPH S. ILLICK

Bulletin 26

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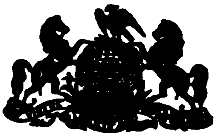
PENNSYLVANIA DEPARTMENT OF FORESTRY
R. Y. Stuart, Commissioner



FOREST GUIDES

The Pennsylvania Department of Forestry recognizes that the Boy Scout movement is one of the most valuable agencies in the State for the elimination of FOREST FIRE. With the approval of National Boy Scout Headquarters, the Department has adopted the official designation, Pennsylvania Forest Guides, to be conferred on any registered member of the Boy Scouts of America, resident of Pennsylvania, who signs a Pennsylvania Forest Guide pledge card to be supplied by the Department of Forestry, Harrisburg, Pa.

Each Pennsylvania Forest Guide will be supplied with a bronze button and a book "GUIDE TO FORESTRY" after he has signed the pledge card. Scoutmasters and other Scout officials signing the pledge card will be given white metal "Pioneer Forest Guide" buttons.

Each Pennsylvania Forest Guide or Pioneer Guide who has been available for service for a whole year in the fight against FOREST FIRE, and responded to all calls for such service, can, upon the recommendation of his Scoutmaster, exchange his Pennsylvania Forest Guide button for a Forest Guide badge at the office of the District Forester.

The Department of Forestry also offers 100 gold medals annually to Boy Scouts for special meritorious service in combating FOREST FIRE in Pennsylvania. It is hoped that all registered Scouts will take advantage of this offer, and help to protect the forests from FOREST FIRE—EVERY MAN'S ENEMY.

Boys who do not belong to the Boy Scout organization can become **AMERICAN FORESTRY GUIDES** by applying to the American Forestry Guide Headquarters, 431 Elm Street, Reading, Pa.

FOREST GUIDE OF PENNSYLVANIA

TO WHOM IT MAY CONCERN:—This is to certify that the bearer hereof is a registered member of the Boy Scouts of America, and having signed the Forest Guide pledge, is authorized to wear the Forest Guide button. The citizens of Pennsylvania are hereby requested to extend all possible courtesies to him as a Forest Guide.

R. Y. STUART, Commissioner of Forestry.

....

(Signature of Scoutmaster) *(Authorized representative of Local Council)*

Date

....

FOREST GUIDE PLEDGE

Believing as a Boy Scout that every citizen should endeavor to see that our Forests, together with their Wild Life and Plant Life, should be protected and conserved for our common good, I do hereby pledge myself to do nothing willfully or carelessly to injure any Forest Tree, Wild Plant, Bird, or harmless Animal, to do all in my power to protect and conserve the same, to urge others to do likewise, to prevent and extinguish forest fires.

Signature..

(Scout)

Troop No. . of..Penna.

2

AN APPRECIATION OF SCOUTING

Scouting is worth while. It makes real boys and girls and then turns them into real men and women. A good Scout makes a good American. A good American makes a good citizen, and good American citizens make America the first Nation in the world.

Scouting is good fun, but it is a lot more than that. It is the best kind of preparation for whatever life is to bring in the days ahead. A good Scout is seldom or never caught unprepared, and a man or a woman who has grown up out of a boy or girl scout is always ready to meet the present and future with head up, eyes front, and shoulders back.

There is a lot more in the United States than can be seen from a street car. It is the land, and the boys and men, girls and women who know the land, who make the strength of this and any other country. Not the least valuable thing about scouting is that it teaches the city boy and girl to know the country, and the country boy and girl to know the country better than he or she otherwise would.

The forest is not only the mother of the fountain, but the mother of men as well. Our ancestors lived in the forest. We live with the help of the forest. Wood is still the most useful of all materials, and will continue to be for many years after you and I have passed to our reward.

Boys and girls who know the out-of-doors render services of great value to their Nation and State by understanding the forest and taking part in its protection. It is just as important for people to think rightly about preventing forest fires as it is for them to think rightly about preventing fires in a town, or any other similar calamity. When you help to make people respect and appreciate the forest you help in its protection.

An understanding of the forest and of the conservation of all natural resources is growing rapidly among Scouts. In two years the number of badges awarded to boy scouts in forestry grew from 153 to 513. I would like to see still more awarded in Pennsylvania.

This booklet is prepared primarily for the Boy Scouts of America, Forest Guides, American Forestry Guides, Wood Craft League, Knights of St. George Cadets, Camp Fire Girls, Girl Guides, and other junior outdoor organizations in Pennsylvania. I hope that every boy and girl who gets this book will not only study its pages but take it into the forest, compare what is here printed with what they find out-of-doors, and so get to know the forest which is the home of scouting and woodcraft and a great necessity for the welfare of the human race.

GIFFORD PINCHOT

PENNSYLVANIA DEPARTMENT OF FORESTY

STATE FOREST COMMISSION

R. Y. Stuart, Commissioner of Forestry.

Edward Bailey.

Henry W. Shoemaker.

Mrs. John L. Lawrence.
(Mary Flynn Lawrence.)

Henry S. Drinker.

Lewis E. Staley, Chief, Bureau of Operation.

George H. Wirt, Chief, Bureau of Protection.

John W. Keller, Chief, Bureau of Silviculture.

Alfred E. Rupp, Chief, Bureau of Lands.

Joseph S. Illick, Chief, Office of Research.

W. Erdman Montgomery, Chief, Office of Maintenance.

A. O. Vorse, Chief, Office of Information.

E. A. Ziegler, Director, State Forest Academy.

GUIDE TO FORESTRY

Book One

By **JOSEPH S. ILLICK**

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The mere mention of the name Robin Hood among a group of boys kindles a desire to go to the woods. There is only one way to satisfy this desire which is inborn in almost every American boy, and that is for him to get ready and go out along the beaten and unbeaten paths of the forests, and there fill up on the many good things which our forests hold in store for us.

Where is the boy who has studied American History and not been inspired by the adventures and heroic deeds of Daniel Boone, Andrew Jackson, Abraham Lincoln, and Theodore Roosevelt. It is the lives of these men that appealed to every boy. Becoming woodswise, learning by doing, being brave, chivalrous, resourceful and leading a simple, clean, and useful life are worthy qualities which should be developed in all the boys of our great Commonwealth.

There is no better place than in the forests for boys and girls to frolic and receive their instruction. Most of their doings relate to the forest, and the whole scheme of their instruction has its setting in the woods. The forest environment offers the best place to seek adventure, to become hard and handy, to think quietly, to identify rocks, to study trees, and learn the need for forestry.

The original forests, which formed the background for the unusual deeds of the early pioneers, are now practically all gone in Pennsylvania. Only a few small and widely scattered patches remain, and these are beginning to show man-made marks of travel and work. A short description of the original forest follows. It is written with the hope that it will help the boys and girls of to-day realize more fully the real thrill of pioneer life, and picture the trials and toils of Daniel Boone and other early explorers.

THE ORIGINAL FOREST

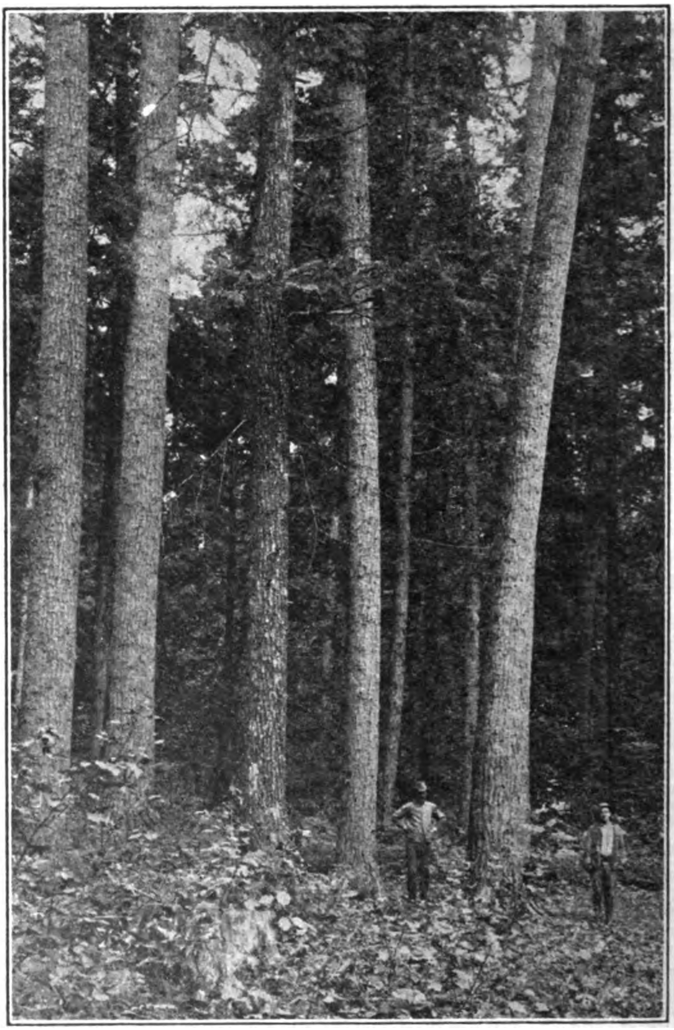
The early American pioneers were confronted on all sides with forests. There seemed to be no end to the woods in those days. They extended practically unbroken from the Atlantic Ocean to the prairies beyond the Mississippi River. They also covered most of the Rocky Mountains and occupied a wide strip on the Pacific Coast. In the aggregate the original forests covered 822,000,000 acres, that is, an area about 30 times the size of the State of Pennsylvania.

The vast extent of the original forests was only one of their characteristics. They contained a large variety of trees which attained a great age, reached a large size, and produced enormous quantities of the choicest lumber ever found on the face of the earth. Nowhere was an equal area ever found which contained such vast quantities of forest products suitable for the needs of man.

Nature made Pennsylvania a great and prosperous State. No phase of her progress is more striking than that which relates to her forests. The entire State with the exception of a few natural meadows and a small number of rough mountain tops was covered with a dense forest growth. No better and more valuable stands of timber could be found in any of the eastern states.

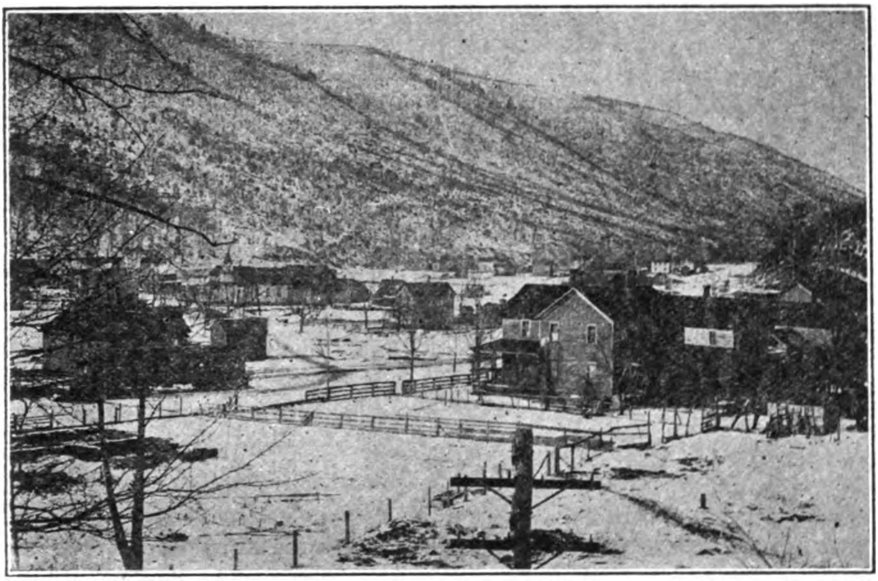
The word Pennsylvania means Penn's woods. The name was derived from the first proprietor of the province and the dense and heavy forests which practically covered all her soil. It required many centuries of Nature's best efforts to produce these matchless and supposedly endless miles of primeval forest, which the first settlers found upon all the hills and in every valley of our great Commonwealth.

The primeval forests, untouched by the axe or saw of man, were a wonderful environment for the pioneer boy. His was not an easy environment, but one full of rich and original experiences. It made him hard, handy and healthy. It brought out the best that was in him. But, we of to-day must not forget that much was required of him. His tasks were hard. He had big jobs to do, the finishing of



THIS IS THE FOREST PRIMEVAL.

Pennsylvania originally had more than 28,000,000 acres of original forest, of which less than 25,000 acres now remain.



A FOREST TRAGEDY.

The forests of big trees have been cut, the land is idle, and the inhabitants of this once prosperous lumbering town are nearly all gone. In its prime the town of Cross Fork, Potter County, had over two thousand inhabitants; now less than twenty people live there.

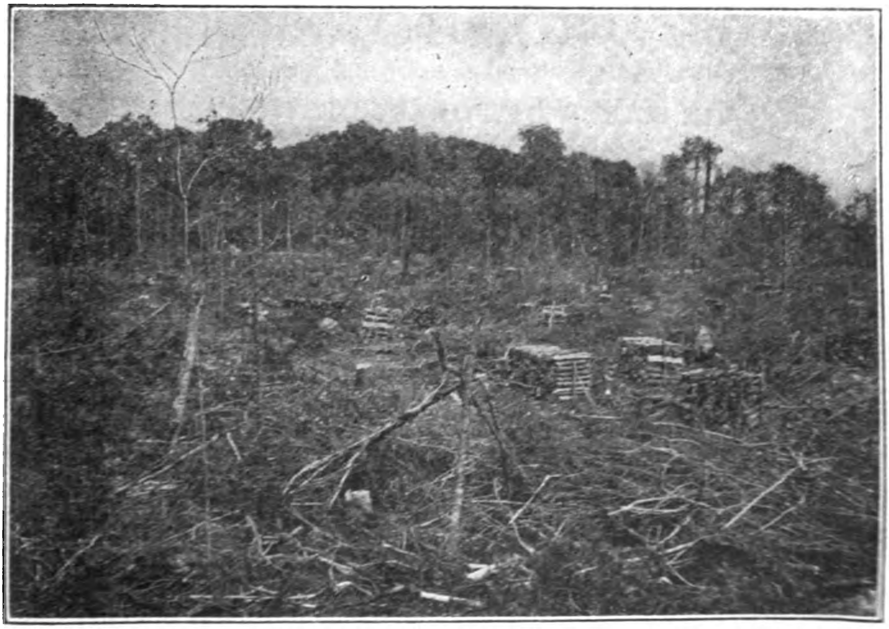


Photo by J. S. Illick.

THE MARCH OF FOREST DESTRUCTION.

The lumberman fells trees, then forest fires rage, and thereafter only acres of desolation remain.

which required many days of hard work in some remote clearing in the woods where human companions were unknown and travelers rarely ventured. To be a pioneer boy means much more than being able to help fell trees, build log cabins, and work in the small family clearings.

The pioneer boy was assigned to outpost positions on the danger line about the forest border. He helped to provide for his family, and protect his friends from numerous and treacherous enemies. His duties required that he become acquainted with the fundamentals of woodcraft. He learned to know the animals of the forest, and studied the ways of the wild folks. He became acquainted with the trees and other plants of the forest. He knew the trees which produced valuable wood, and could recognize the medicinal herbs. The pioneer boy was indeed rich, not in money but in knowledge and ability. He knew his environment and could do things. He was a keen observer, fearless explorer, and a cheerful doer of many good and useful deeds.

Every boy of to-day can find some characteristics or virtues of the pioneer boy of the early days which are worth striving for. There is only one way to get these virtues, and that is the best way. Go out in the glorious and boundless out-of-doors, do the things the pioneer boy did, and learn your lessons as he learned his.

THE MARCH OF FOREST DESTRUCTION

Pennsylvania has a land area of 28,692,480 acres. Almost every acre was covered originally with an excellent forest growth. But a great change has taken place since the days when the early settlers began building their cabins and clearing their fields. To-day only a few small patches of the original forest remain. Where once stood heavy stands of the choicest white pine, hemlock, cherry, oak and other important timber trees, there exist now only endless stretches of barren mountain land. The questions which naturally follow are: What brought about this rapid change? Who were the chief agents of forest destruction?

There were a number of agents of destruction, but man played the leading role. He felled the monarchs of the forest, operated sawmills, and started forest fires. Even before Penn arrived in 1682, the Dutch and Swedes had sawmills on the "South River" as the Delaware was then known. But they were few in number and did not cut much timber. The date when the first sawmills began operating in some of the counties of the State is given in the following table:

COUNTY	YEAR
Philadelphia	1662
Franklin	1732
Berks	1735
Lycoming	1773
Allegheny	1776
Huntingdon	1786
Wyoming	1793
Warren	1800
Clarion	1805
Elk	1825

It was not until 1838 that the first sawmill was erected in Williamsport. This was the actual beginning of the great lumber industry of Pennsylvania, which was at its best between 1870 and 1890. In 1850 the lumber output of Pennsylvania was surpassed by only one state—New York—and in 1860 the Keystone State stood at the very top. She maintained a rank of first or second until 1890, when she took third place. Fourth place was given her in 1900, and by 1918 she had dropped down to the twentieth place, which position she is still holding.

Pennsylvania's fall as a timber producing state was rapid. It could not have been otherwise, for her forests were gone. Just thirteen years ago as much wood was cut in Pennsylvania as her citizens and industries used. Now the annual cut of wood is only one-third as much as we consume, and what is far more significant, our forests are growing only about one-tenth as much lumber as we use.

The great and glorious lumber industry flourished for a short while in Pennsylvania. It brought much business to the State, but left a big blot on its otherwise wonderful and prosperous record —**THE PENNSYLVANIA DESERT.** There are in our State to-day six million acres of mountain land, which can produce only one crop, and that is a forest crop. This area is too rough and rocky for the plow; but if handled properly will provide a continuous flow of valuable and necessary forest products.

We do not want to keep this unproductive desert. To do so would be entirely wrong and selfish, and show poor foresight. It becomes us to show our worth and good sense by treating these six million acres in such a way that a full crop of necessary forest products will flow from them continuously.

◆

THE PRESENT FOREST SITUATION

We do not have enough wood to satisfy fully the present demands. It is becoming scarcer each year and the prices are rising rapidly. Wood will forever be a human need. It is used in the industries, the home, and the fields. It is an element of human necessity from the cradle to the coffin. Next to food and clothing it is the most indispensable product of nature. We are now in the early stages of a timber shortage, which we must not allow to grow worse, for without wood there can be no agriculture, no manufacture, no commerce.

Most of the work of reclaiming Pennsylvania's Desert will fall to young people. They are the ones who look forward and want to set things aright. It is they who are building for the future, and concerned with the problems which require a long time to complete.

The boys and girls of Pennsylvania can render a great and lasting service by helping in the restoration of a forest growth upon Pennsylvania's Desert. They can at least do a part of this fine piece of work. In fact, they have started upon the job already, are taking it seriously, and making commendable progress. Boys are helping to extinguish forest fires in every part of the State. In some cases they put out fires without any help. They have also reported many fires to forest officers. A troop of Boy Scouts fought a fire strenuously for one day and night and conquered it completely. It will ever be to their credit for having worked so hard and accomplished so much. The Scouts have also planted many trees, cleaned up the forest of weeds and debris, improved springs, built trails, and cared for birds and other wild animals. They have done much good, which is being appreciated and will live long after them.

But in order that every boy and girl may do his and her part well, and probably better than would otherwise have been possible, this little booklet has been prepared. It does not aim to tell all about the forests or point out all good forestry practices, but its purpose is rather to impress our young folks with a few of the most important things which they should know, and do in order that they may help protect and improve our forests.

FOREST AREA OF PENNSYLVANIA

Pennsylvania was originally one of the best, if not the very best, wooded state in the eastern half of our country. The total land area of Pennsylvania is usually given as 28,692,480 acres. Practically the entire state, with the exception of a few natural meadows and several rough mountain tops, was originally covered with trees.

The opening of agricultural lands, lumbering operations, forest fires, and other agents of forest destruction, have reduced this acreage considerably. The following table gives the present forest area of Pennsylvania by counties:

COUNTY	TOTAL FOREST AREA (ACRES)	COUNTY	TOTAL FOREST AREA (ACRES)
Adams,	99,262	Lackawanna.	110,020
Allegheny.	109,200	Lancaster,	99,177
Armstrong,	127,913	Lawrence,	48,951
Beaver,	77,362	Lebanon,	41,650
Bedford,	276,000	Lehigh,	47,500
Berks,	115,096	Luzerne,	380,827
Blair,	136,704	Lycoming,	489,855
Bradford,	304,416	McKean,	565,000
Bucks,	63,304	Mercer,	106,650
Butler,	105,565	Mifflin,	160,251
Cambria,	256,972	Monroe,	210,000
Cameron,	197,500	Montgomery,	47,200
Carbon,	124,800	Montour,	33,280
Centre,	496,013	Northampton,	39,700
Chester,	88,676	Northumberland,	92,000
Clarion,	153,000	Perry,	184,039
Clearfield,	500,000	Philadelphia,	4,500
Clinton,	453,608	Pike,	261,118
Columbia,	137,952	Potter,	509,921
Crawford,	210,000	Schuylkill,	325,000
Cumberland,	97,423	Snyder,	67,000
Dauphin,	97,603	Somerset.	399,960
Delaware,	15,000	Sullivan,	210,000
Elk,	417,000	Susquehanna,	180,000
Erie,	80,000	Tioga,	375,440
Fayette,	335,000	Union,	98,440
Forest,	233,648	Venango,	176,000
Franklin,	153,303	Warren,	395,486
Fulton,	140,000	Washington,	76,861
Greene,	89,420	Wayne,	283,707
Huntingdon,	355,000	Westmoreland,	215,450
Indiana,	176,000	Wyoming,	139,744
Jefferson,	221,000	York,	119,630
Juniata,	108,500		
		Total Forest Area	13,046,557

A study of the above table shows that seven adjoining counties, located in the north-central part of the State, comprise more than one-fourth of the total forest area of the State. These counties are McKean, Potter, Clearfield, Centre, Lycoming, Clinton, and Elk. It is quite significant that while the seven counties comprise more than one-fourth of the total forest area, they make up less than one-twenty-third of the State's total population. The county having the largest forest area is McKean. It has a total land area of 631,680 acres of which 565,000 acres, or 89.4%, is forested.

There are six counties in the State of Pennsylvania that have more than 75% of their total land area in forests. They are McKean, Forest, Elk, Clinton, Cameron, and Pike. It is significant that twenty-six of the sixty-seven counties of Pennsylvania have more than 50% of their total land area in forests, and that 45.5% of the total land area of the State is forest land.

There are in Pennsylvania 13,046,557 acres of forest land and 8,720,017 inhabitants. This means that there are one and one-half acres of forest land for each inhabitant of the Keystone State. A study of the forest area and population of each county shows a wide variation. There are in the State twenty counties that have less than one acre of forest land for each inhabitant; twenty-four counties that have from one to ten acres of forest land to each inhabitant; ten counties with from ten to fifteen acres of forest land to each inhabitant; and only three counties that have more than twenty-five acres of forest land for each inhabitant.

The forest area per capita ranges from .0025 acres in Philadelphia County to 38.3 acres in Pike County. The counties having the largest forest acreage per capita are:

COUNTY	FOREST AREA PER CAPITA (Acres)
Pike,	38.3
Cameron,	31.4
Forest,	31.0
Potter,	24.2
Sullivan,	22.1

Some of the counties having the smallest forest area per Capita are:

COUNTY	FOREST AREA PER CAPITA (Acres)
Philadelphia,	.0025
Delaware,	.09
Montgomery,	.2
Lehigh,	.3
Northampton,	.3
Washington,	.4
Lackawanna,	.4
Erie,	.5

The forest land of Pennsylvania may be placed in the following classes:

	AREA (Acres)
State forest land,	1,126,237
Farm woodlots,	4,043,902
Outside of State Forests and farm woodlots,	7,876,418
Total,	13,046,557

WHAT A FOREST IS

A forest is a complex community of living things. It is more than a mere collection of trees, for associated with the trees are many other plants and animals, all of which live in close relationship with one another.

There is a right and a wrong way for boys and girls to find out what a forest really is. Many hours may be spent in schoolrooms, libraries, and parlors studing about the forest and its inhabitants. Such a method has some good points, but there is a better way. The right way to become acquainted with the inhabitants of forests consists in getting ready, going out, hiking right into them and there beginning a first-hand acquaintance with the many and interesting members of which it is made up.

Do not plan to become acquainted with all the forest inhabitants on the first trip into the woods for there are too many of them. Just as it is impossible to become acquainted with all the inhabitants of a city in a single day, so it is beyond the realm of the possible to learn to know all of the members of the forest on a single hike.

A good plan for the first hike to the forest is to list or make a census of all the different groups or classes of plants and animals which you may observe, that is, make no special attempt to name the individuals. This may be done by making a table of two columns, the one with the heading **Plants** and the other **Animals**, and listing under each all the living things observed. Only two columns are required, for all living things are either plants or animals. The table may be made up in the following manner:

PLANTS	ANIMALS
1. Trees	1. Deer
2. Shrubs	2. Squirrels
3. Ferns	3. Rabbits
4. Mosses, etc.	4. Birds, etc.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Such an exercise will show that while the trees are the most conspicuous and the most important members of the forest, they are by no means its only inhabitants. Instead, the forest is a complex community of many living things, whose activities are so closely inter-related that the absence of any group may make itself felt on all the remaining members.

Photo by Charles I. Buvinger.

IT IS EVENING. ALL IS WELL WITH THE SCOUTS AND EVERYBODY IS HAPPY.

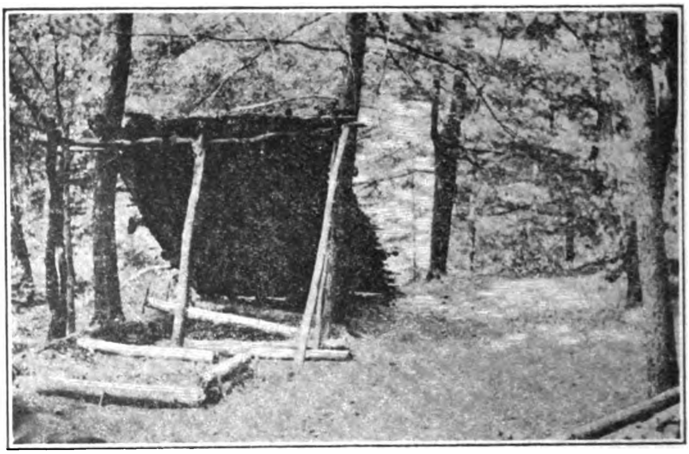


Photo by Charles I. Buvinger.

A CRUDE BUT COMFORTABLE LEAN-TO SHELTER.

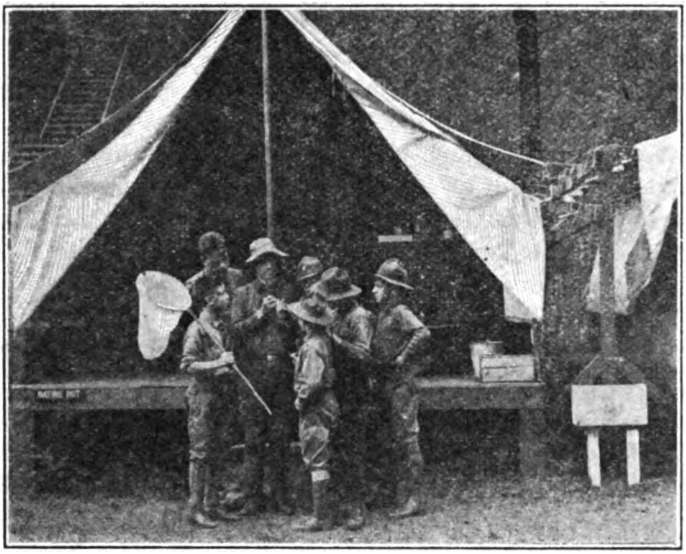


Photo by Charles I. Buvinger.

A LESSON IN NATURE STUDY. BE SURE TO SEE WHAT YOU LOOK AT.

Photo by Charles I. Buvinger.

A TRIO OF TREE LOVERS.

They have named and identified all the different trees about their camp.

Photo by Charles I. Buvinger.

IT IS TRUE. ONE TREE MAY MAKE A MILLION MATCHES, BUT ONE MATCH MAY BURN A MILLION TREES.

WHAT FORESTRY IS

Forestry is the art of handling forest land in such a way that it will be of the greatest service to man. It is no field for selfish effort and has no place for a greedy goal. Good forestry considers the wants of future generations as well as our present needs. It recommends the wise use of all forest products now on hand, and insists that a growth of valuable forest trees be maintained continuously on every acre of forest land. Idle acres, barren slopes, areas of desolation, and unproductive land are objects to be overcome and improved.

WHAT IS WRONG WITH OUR FORESTS

That our forests are in urgent need of improvement is no longer a question. Many of them are unattractive; fire-scarred snags, exposed boulders, and bare soil being among their most striking characteristics. Most of them are unsanitary, for they are filled with debris, dirt, half rotten trunks, stumps, and insect infested stuff. All of our forests are producing fewer products than they are capable of turning out. Furthermore, there appears to be no order in them, for they have developed without any attention or care.

A general study of prevailing forest conditions shows that the forests of to-day fall short of being satisfactory in at least four important ways:

1. **They do not produce enough good wood.**
2. **They are not attractive in appearance.**
3. **They are positively unclean.**
4. **There is no order in them.**

The boys and girls cannot do all the things or carry on all the operations which are necessary to bring about the desired improvements, but there are a number of lines of work which they can and should do; and it is equally important to know that there are other things that should not be done. Here are some suggestions:

1. **Do not start a forest fire.**
2. **Tell all your companions about the damage which forest fires do.**
3. **Report all forest fires to the nearest forest officer.**
4. **Learn how to fight forest fires, and take a hand in putting them out.**
5. **Plant forest trees in vacant corners, wasteplaces, abandoned fields, on barren mountain slopes and other unoccupied forest land.**
6. **Destroy insects which injure and kill forest trees.**
7. **Destroy rots, blights, and other fungous foes of the forest.**
8. **Help clean up the forest by using the dead wood found lying on the forest floor.**
9. **Cut out only undesirable trees and guard the more valuable ones.**

HOW FOREST FIRES START

Someone may have told you that lightning causes many forest fires or that spontaneous combustion may furnish the spark which starts the fires on their mission of destruction. In order that we may get at the very bottom of this important subject, and not be misinformed, let us take advantage of the results of a careful study which has been made of the causes of forest fires in Pennsylvania. They may be summarized as follows:

1. **Few, if any, forest fires are the result of spontaneous combustion.**

2. **Lightning does not cause more than 10 or 12 forest fires each year in Pennsylvania, that is, about four-fifths of one per cent. of the total number.**

3. **Someone's carelessness or neglect causes 99 per cent. of the forest fires which occur each year in Pennsylvania. No matter what the immediate or apparent cause happens to be the real original cause can in almost all cases be traced back to the carelessness or neglect of some person or group of persons. Carelessly constructed or neglected camp fires have started many forest fires. The careless throwing away of a burning match, cigarette, or tobacco among dry leaves has been the cause of some of our worst fires. Sparks from engines start many forest fires, but the real cause is the fact that the smoke stacks were not properly equipped with a satisfactory spark arrester, or a satisfactorily cleared safety strip was not kept on both sides of the road bed. We all believe in clearing up unsightly and unsanitary places, but too often brush burners choose a windy day or forget to take proper precaution so that the fires which they start cannot get away from them. In many instances those in charge of a fire go away for a while, only to return and find that the fire has escaped and is traveling rapidly over an adjoining woodlot or ascending a steep and heavily timbered mountain slope.**

4. **Be sure the camp fire is out before leaving it. Take no chances, for you can easily tramp it out, smother it with ground, or soak it with water.**

5. **Be very careful in cleaning up a camp site. Burn the undesirable material when there is little danger of the fire getting beyond control.**

6. **Be as careful with fire in the forest as in your home, for it is an evil doer if it gets beyond control. Careful boys and girls take no chances with fire in or near the woods, for its actions are treacherous and its destructive power great, if it gets beyond control.**

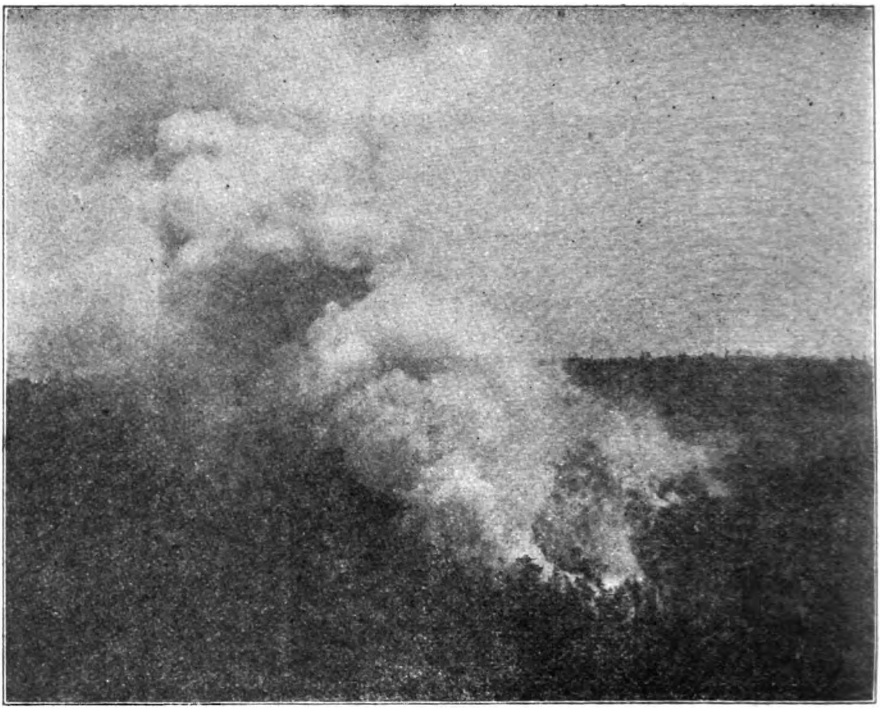


Photo by J. S. Illick.

FOREST FIRE IS EVERY MAN'S ENEMY.

Be sure to look over a forest fire before you tackle it, but do not lose much time. Watching and waiting will not do the work. Locate the "header" and fight it first The "header" is the part of the fire that travels most rapidly. The top of a ridge, or just beyond the top and right in front of the "header" of a fire, is the right place to get busy.

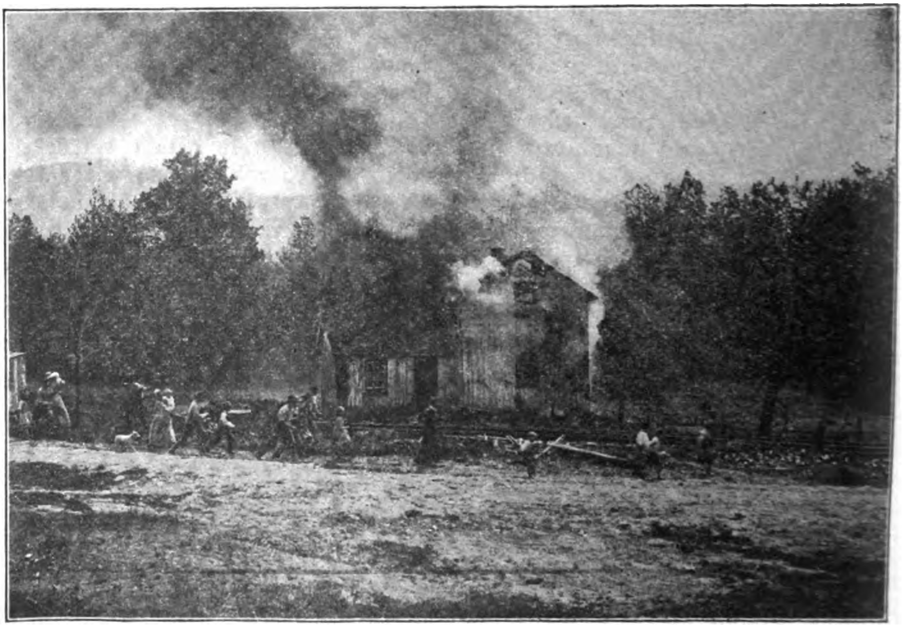


Photo by J. S. Illick.

FOREST FIRES MAY DESTROY HOMES.

There is no end to the damage that forest fires do. In 1918 nearly 400 persons lost their lives in a single forest fire in Minnesota, about 2,000 were more or less seriously burned, and 13,000 rendered homeless.

A MODERN STEEL FOREST FIRE TOWER. IT IS 60 FEET HIGH AND FROM ITS TOP MAY BE VIEWED 500,000 ACRES OF FOREST LAND.

WHAT FOREST FIRES DO.

The first thing that every boy and girl should know about forest fires is the fact that they do absolutely no good. They bring no benefits to mankind, for damage and loss are the results of their work. It would require many pages to discuss fully the loss caused by forest fires. The following outline will show some of the damage which they do:

1. **Forest fires destroy the beauty and value of a region.**
2. **They destroy the animal and plant life of the forests.**
3. **They destroy the seeds and seedlings which would develop into stately stands of timber.**
4. **They kill enormous quantities of growing timber.**
5. **They consume a large amount of felled timber and other forest products stored in forests.**
6. **They consume the leaf litter and humus on the forest floor.**
7. **They impoverish the soil to such an extent that its capacity to produce timber is almost negligible. Briefly, they prevent the production of enormous quantities of needed forest products.**
8. **They have already made a big desert in Pennsylvania. It covers a large part of the mountains of our State.**
9. **They open the way for the destructive work of insects, fungi, erosion, floods and drought.**
10. **They sometimes kill live stock, and frequently destroy buildings, crops and fences.**
11. **They occasionally destroy houses.**
12. **They even may cause the loss of human lives.**

There appears to be no end to the damage which forest fires do. We cannot let them go on. It is our duty to step in right now and fight them to a finish.

WHY PREVENT FOREST FIRES.

There are many reasons why forest fires should be prevented. It would make a list as long as an arm if an attempt were made to name them all, but everyone cannot help but become enthusiastic about preventing forest fires after knowing that:

1. **Forest fires are unnecessary. There exists no need for them and they should be stopped.**
2. **Forest fires benefit no one, except a few selfish people who still have the false notion that forest fires are necessary to insure a crop of Huckleberries.**

3. **The prevention of forest fires is good business, for they are the curse of our forests. They do only evil. No good comes from them. We endure hardship and suffer great loss because of them.**
4. **They are responsible for the greatest leak which exists at the present time in our otherwise prosperous Commonwealth.**
5. **The prevention of forest fires is wise forethought, for they are not only destroying annually an enormous quantity of wood, but also prevent an inestimable amount of wood from growing. It is our duty to stop them now, because of the damage they do, and the hardships which will bear down upon future generations through a shortage of forest products.**

HOW TO PREVENT FOREST FIRES.

It seems to follow from the study of the causes of forest fires that the best way to prevent them is to have every inhabitant and every visitor of our Commonwealth be careful and thoughtful about the use of fire in all forms and at all times. The following suggestions should be helpful in out-of-door activities:

1. **Be sure you do not throw away a lighted match or any other burning material while walking through, resting, or camping within the woods.**
2. **Clear the ground of all inflammable material before building a camp fire. If possible, dig a small pit in a clear area, and surround it at least on three sides with a wall of stones. This makes an ideal and safe fire place.**
3. **Never build a big fire. It is neither necessary nor safe.**
4. **Of course, most boys do not smoke, but if you are allowed to smoke or choose to "steal a smoke," be very careful in disposing of the burning tobacco, cigar, or cigarette. Many a forest fire was started by a carelessly disposed of cigar or cigarette, and the thoughtless throwing away of burning tobacco.**

HOW TO FIGHT FOREST FIRES.

Someone has said that the best way to fight forest fires is to prevent them from starting. That is good advice and a fine idea, but some fires will start and must be fought. The putting out of a forest fire is a real fight. It is one of the severest contests a group of young men can engage in. Forest fires are a difficult enemy to overcome, for their advances are usually fierce and uncertain.

In order to overcome them quickly the fighters must take heart, and then "dig in" and use their heads, hands and feet with all their might. By so doing they will be able to conquer the most formidable foe of the forest.

The best results will be obtained if the fighting force is well equipped, properly organized, and so trained that every member understands the most important rules of the business. A schedule follows which points out some of the most imporant things which should be done in case of forest fires.

1. **Always be on the watch for forest fires, especially during the spring and fall when they are apt to occur and in regions where they happen frequently.**
2. **The first thing to do, if you are at or near a fire when it starts, and it is not too large, is to try to put it out.**
3. **The first thing to do, if you are at a distance from the fire, or if it is large in size and burning rapidly, is to notify the nearest forest officer, who may be a Forester, Forest Ranger, Forest Fire Warden or Game Warden.**
4. **The second thing to do is to get together a crew of fire fighters.**
5. **See to it that the fighters are properly equipped.**
6. **Get the fighters to the fire as soon as possible. The secret of success in fighting forest fires is to knock, kick or otherwise get them out in the first round, for they become larger and stronger the longer you allow them to go ahead.**
7. **As you approach a fire look it over and proceed to take the best position to attack it. Always tackle "the header" first, that is the part of the fire which is traveling fastest.**
8. **Upon reaching the fire, offer your service to the forest officer in charge. If no forest officer is present, organize your men and tackle the fire without delay. Lose as little time as possible in discussing the situation.**
9. **A slow fire may be stopped by beating it out, but in cases where fires are progressing very rapidly, it is best to clear a line about two feet wide of all inflammable material some distance ahead of the fire. If the fire is not advancing too fast it will stop when it reaches this cleared line, but if a strong wind is blowing it is very apt to jump over the cleared line and proceed onward doing destructive work. In the case of rapidly advancing fires it is recommendable to start a "Back Fire" on the side of the cleared line towards the original fire, and when they meet, both will die out for want of inflammable material. A "Back Fire" improperly placed or poorly timed may do more damage than good. Therefore, no "Back Fire" should be started by boys**

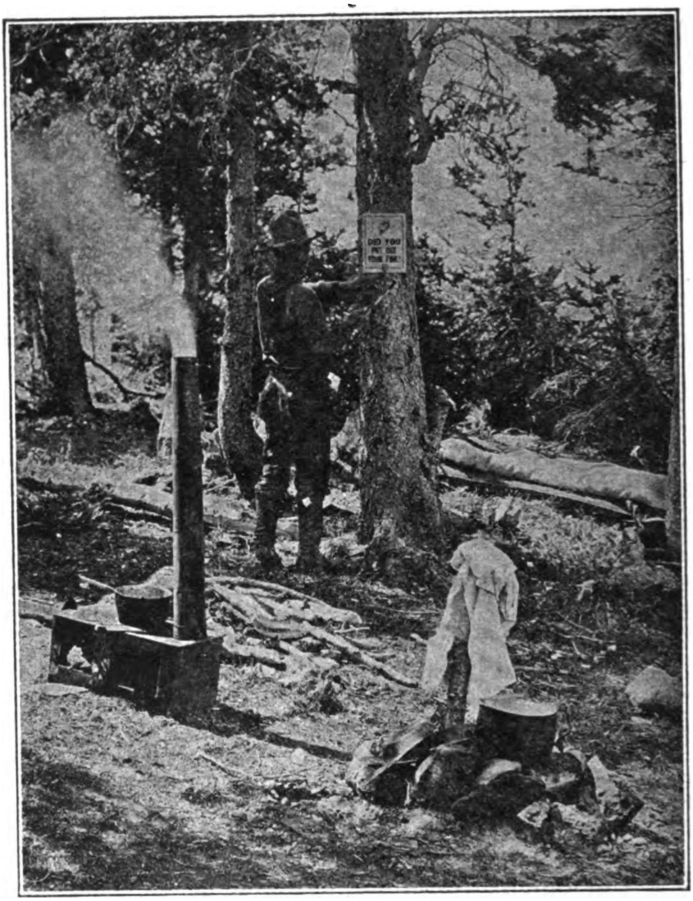
unless a forest officer, or another person who has had experience in fighting forest fires, is at hand to direct the fight.

10. One of the most responsible positions on a fire line is that of the "guards" who control the back fire and see to it that the fire does not jump over the fire line.
11. Do not expect every established fire line to hold, for you will sometimes be compelled to fall back, reorganize the fighters and begin to battle from a new and more advantageous position.
12. Do not give up until you have won the fight. Remember that the fight is not really won until the last spark is out. Therefore, do not leave a fire immediately after the flames have been subdued, but patrol the lines and see to it that it does not break out anew and go on another spree of destruction.

OTHER THINGS TO DO.

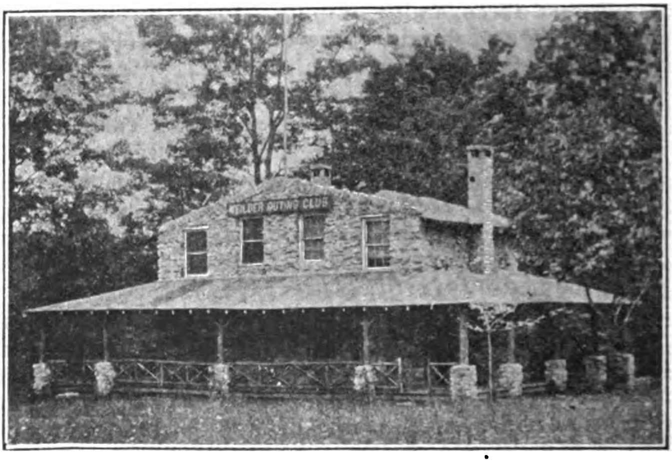
The stopping of forest fires will do much to rebuild our devastated forests, but there are other things which must also be done in order to place them in a satisfactory condition. These important tasks should go hand in hand with or follow right after protection. Some of these essential things are:

1. Securing a new growth of valuable trees as quickly as possible on every acre of devastated land within the State. We cannot afford to leave so many acres of mountain land remain idle. It does not pay to delay. Right now is the time to see to it that all unproductive areas of forest land are so stocked with trees that they will begin to produce a valuable forest crop.
2. Another thing to do is to give preference to the important forest trees and eliminate as rapidly as possible the undesirable kinds. There are over 100 different kind of trees and about 200 different kind of shrubs native to Pennsylvania. Nature does not show any preference for the important timber trees in the early stage of reforestation. As a rule, many different kind of trees come up after forest fires and lumbering operations, and in the struggle for an existence the inferior ones often win out. If the job of restocking our forest land is left to nature entirely, a great deal of ground will be occupied by worthless trees. It is our business, therefore, to learn to know the best trees, and then help them overcome inferior ones such as scrub oak, fire cherry, trembling aspen, sumachs and other similar weed trees. While in camp boys and girls should show their appreciation of the land owner by helping him improve the composition of his forest by cutting out the inferior trees and thus help those of better quality.
3. A third thing which is essential to rebuilding our forests properly is the removal from the forests of all trees of


DID YOU PUT OUT YOUR FIRE

Courtesy of the U. S. Forest Service.

BE SURE THAT THE CAMP FIRE IS OUT BEFORE YOU LEAVE.



A COMFORTABLE CAMP ON THE MOSHANNON STATE FOREST IN PENNSYLVANIA.

There are 563 permanent camp sites under lease on the State Forest of Pennsylvania, and during 1921 at least 80,000 people used the State Forests for camping and recreation purposes.

A PLANTATION OF YOUNG WHITE PINE TREES.

Make your idle land pay. Plant forest trees on waste places.

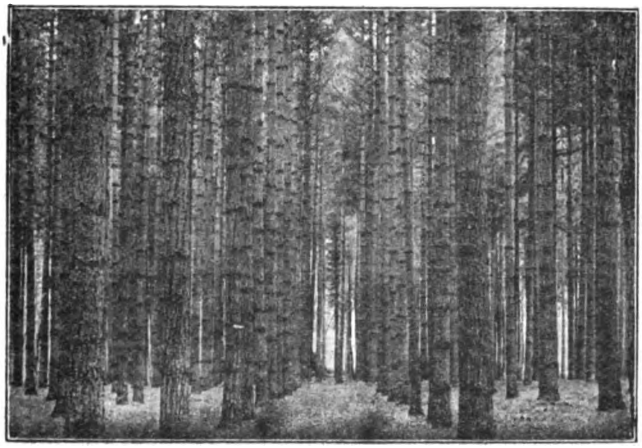


Photo by J. S. Illick.

AN ATTRACTIVE AND THRIFTY STAND OF WHITE PINE PLANTED 48 YEARS AGO.

Note the branch scars that encircle the trunks. The distance between the rings is the height growth of one year.

poor quality, and undesirable form, as well as all dead, dying and damaged specimens. In almost every forest there are wolf trees, that is, trees which are unattractive, have a wide-spreading crown, and a twisted and hollow trunk. Such trees grow very little in size and are continuously decreasing in value. They should be removed from the forest for they possess no future promise, and are suppressing and even killing many young and thrifty trees beneath them. Their days of usefulness and service are past, and the way should be opened up for a younger generation of trees by removing their suppressors.

Boys and girls should make it a rule to use for camping and other essential purposes only such material whose removal will improve the forests, and thus assist in rebuilding them and making them even more productive and more valuable than the original forests.

4. **Another important thing to do is to stock completely all forest land so that it will begin producing forest products of value. Our forests are now full of gaps and openings in which nothing of value is now being produced. Many of these areas are small in size, while some of them cover large areas. The loss from a single blank area may not be great, but when all of them are added together the loss is enormous.**

Let us give nature a chance to establish forests of baby trees on all these areas, but if she does not succeed, the thing to do is to go out upon these barren areas and plant upon them selected trees, which are well-known, sure to grow, and will produce a valuable crop of timber. We must not compete with nature or try to outdo her in places where she is doing good work, but our aim should be to fill in all fail places. Boys and girls can be of great service in this work for there is a big tree planting job before all of us. It will be a creditable piece of work for the young and brave men of our State to go out among the hills and start to re-clothe them with the best trees which are now available.

WHY PLANT FOREST TREES.

Nature working through many centuries produced the original forest. It took a long time for her to accomplish this wonderful task. In some localities nature will again produce fine forests, while in other places she is making progress very slowly. We cannot afford to wait. We must put our idle mountain land to work at once for we need all the forest products which all the available areas are capable of producing.

Wherever nature is not restoring a forest growth, we may go in and help her by planting seedlings of valuable forest trees. The boys and girls of Pennsylvania have already planted many trees, and it is fair to assume that as they learn more about this delightful pastime and helpful practice they will plant an increasing number each year. You may not know about it, but it is a fact that almost 50 million small forest trees have been raised already in the nurseries operated by the Pennsylvania Department of Forestry and all of them have been planted on forest land within the Keystone State. More than 34 million of these trees have been planted on the State forests, the remainder having been set out by private owners of woodland. How rapidly the practice of forest tree planting is growing may be learned from the following table:

YEAR	Number of Trees Supplied to Private Planters
1910	66,374
1911	25,360
1912	66,854
1913	47,770
1914	108,685
1915	115,577
1916	1,471,875
1917	1,812,997
1918	2,186,899
1919	3,139,531
1920	2,543,374
1921	3,041,710
Total	14,627,006

Every Pennsylvania boy and girl should be a tree planter. It is a helpful and wholesome kind of work. In order that every boy and girl may know some of the good points of tree planting, a list of the benefits that may be derived therefrom follows:

1. **Planted trees will help supply the constantly growing demand for wood. They are a credit to us who set them out, and will be a blessing to future generations. Cheap wood is gone forever in Pennsylvania.**
2. **Planted trees afford excellent protection to our water supplies and prevent erosion on steep slopes.**
3. **Planted trees beautify and protect homes and make our landscape cheerful.**
4. **Planted trees utilize the energies of nature which might otherwise be wasted.**
5. **Planted trees beautify and improve highways, waterways, and byways.**
6. Tree planting will make worthles land productive and yield useful forest crops.

7. **Tree planting will help fill up the storehouse of needed wealth.**
8. **The planted forests of France helped win the war.**

There is a great need for forest tree planting. It is not hard to find places upon which trees should be planted. Bare hillsides and poorly stocked mountain land is common, idle corners are present everywhere, and eroding slopes and gullies are doing enormous damage in every community.

Boys and girls should remember that they do not stand alone when they desire to plant trees, for the Pennsylvania Department of Forestry will co-operate with them. It will supply the trees for planting if at least 100 are set out. The only cost attached to the trees is the packing and shipping charges, which should not exceed about 75 cents per thousand. A troop of Boy Scouts in April, 1920, planted one thousand trees upon a hillside near Sellersville, Pa., in about two hours. They enjoyed the work so much that they sent in a "hurry up" order for 500 more, which they also planted and now they are planning to take good care of them and watch them grow in size, value, and beauty.

He that planteth a tree is a servant of God,
He provideth a kindness for many generations,
And faces that he hath not seen shall bless him.

HENRY VAN DYKE

WHY BECOME ACQUAINTED WITH TREES.

Every boy and girl will sooner or later ask themselves the question, why should I put forth any effort to become acquainted with trees for they are such commonplace things? At first they may not be able to satisfy themselves that the study of trees is important, but as they revolve the question in their minds they will begin to see what a wide and practical application to every day life this subject has, and that trees ever since the creation have been among man's best friends and most useful helpers, and as time goes on and wood becomes scarcer they will play an even more important role in satisfying his needs.

Suppose we pause just long enough to think about a few of the ways in which trees have been our friends and helpers. We cannot begin to take an itemized census of all the different benefits derived from them for we would soon have a list as long as our arms and only half finished, but in order that we may not overlook entirely some of their good points a list of the most important of them follows:

1. **Trees decorate the landscape. A treeless place is indeed cheerless.**
2. **Trees supply us with shade and shelter, and protect our houses and other buildings against storms.**

3. **Trees beautify our homes, highways, and byways.**
4. **Trees give shelter to and serve as a refuge for birds and other wild animals.**
5. **Trees supply shade and shelter to domestic animals when in the open.**
6. **Trees help make, fix, and improve the soil.**
7. **Trees protect steep mountain slopes against erosion, and bind the soil along the banks of streams.**
8. **Trees increase the run-off of water during periods of drought.**
9. **Trees help purify the atmosphere.**
10. **Trees decrease the run-off of water during periods of flood.**
11. **Trees help maintain and improve the health and efficiency of our citizens.**
12. **Trees help raise the moral standard and social worth of our boys and girls.**
13. **Trees furnish the raw material for many of our most important industries.**
14. **Trees supply us with some of our most necessary products of life. They supply us with the wood with which to build, furnish and warm our homes. They are the main source of the raw material from which the paper upon which we write is made.**
15. **Every Pennsylvania boy and girl should become acquainted with our native trees so that they can recognize the difference between the important timber trees and the inferior (weed) species.**

HOW TO BECOME ACQUAINTED WITH TREES.

There is more than one way for boys and girls to become acquainted with our common trees. Some are so fortunate as to have a teacher available who knows the trees and is willing to point out their distinctive features and peculiar habits. Others are less fortunate in that they do not have a teacher familiar with the trees, but they do have available for use a good supply of helpful tree leaflets and manuals. But there is a third group of boys and girls and this includes by far the largest number, who have neither a good teacher nor satisfactory literature available to pursue a course of tree study. It is primarily for this third class of boys and girls that the material on the following pages has been prepared.

One of the first things which boys and girls should know about tree study is the fact that to attempt to learn to know all the trees is a big and long job, for there are over a hundred different trees native to Pennsylvania. It may be well in this connection to remember the old adage "Do not attempt too much for fear of accomplishing too little." Much better results will be attained by selecting a small group of trees, or a certain number of representative

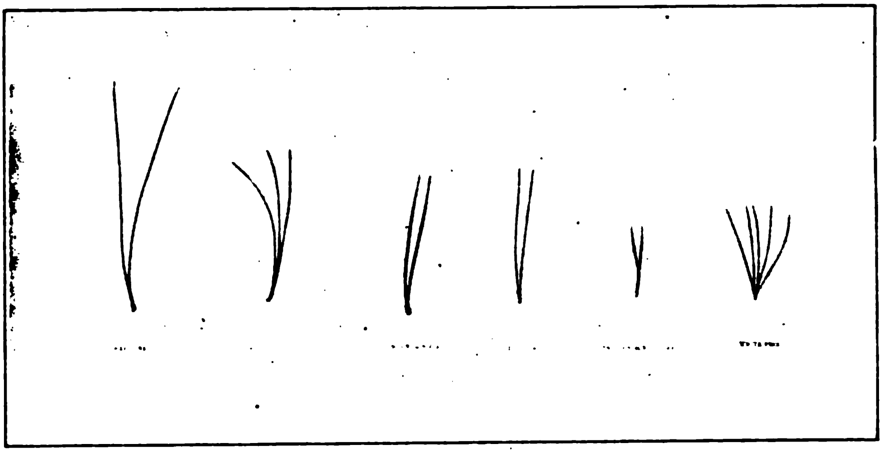


Photo by J. S. Illick.

NEEDLE CLUSTERS OF THE SIX PINES NATIVE TO PENNSYLVANIA

White pine is the only pine native to Pennsylvania with five needles in a cluster; pitch pine has three needles in a cluster; while the other four native pines have two needles in a cluster. Left to right: Red pine, pitch pine, table mountain pine, short-leaf or yellow pine, Jersey or scrub pine, white pine.

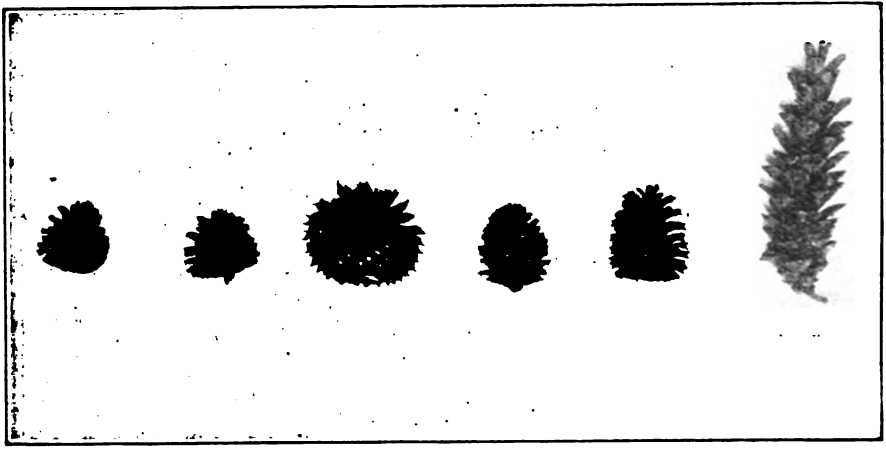
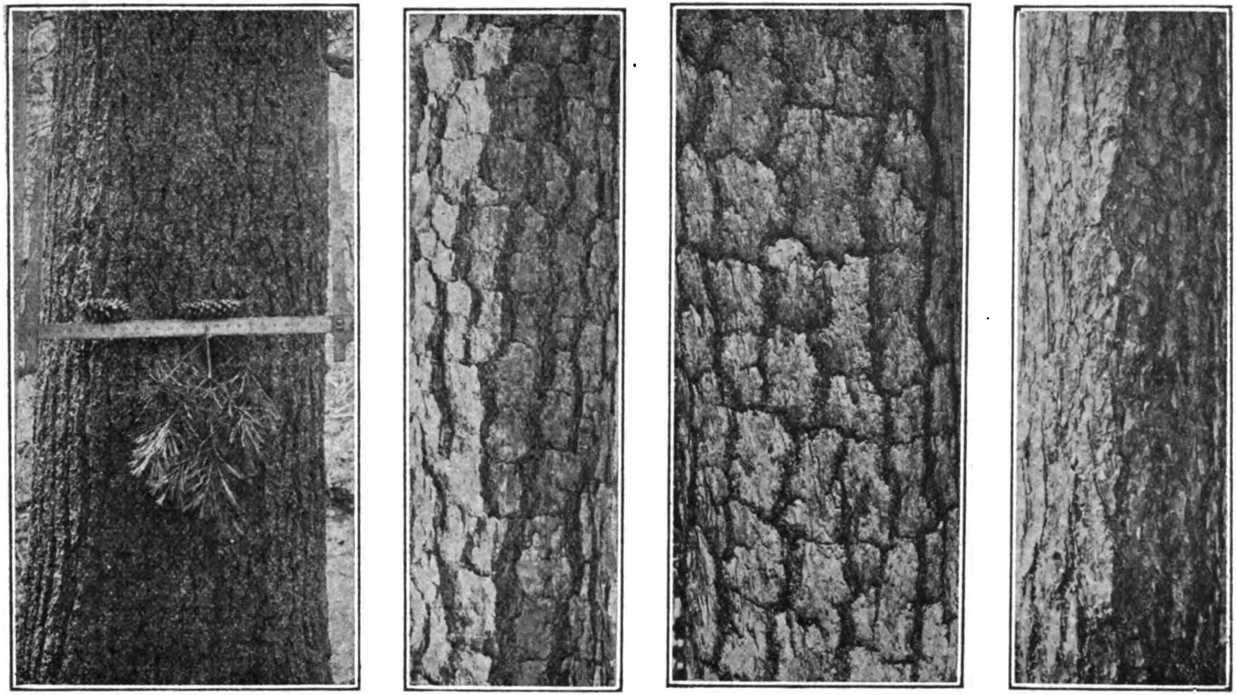


Photo by J. S. Illick.

CONES OF THE SIX PINES NATIVE TO PENNSYLVANIA.

Left to right: Red pine, pitch pine, table mountain pine, short-leaf or yellow pine, Jersey or scrub pine, white pine.



White pine. Pitch pine. Short-leaf pine. Red pine.

THE PINES OF PENNSYLVANIA MAY BE DISTINGUISHED BY THEIR BARK.

species and learn to know them well, rather than attempt to master all of them and later on find that you have acquired only a superficial smattering of most of them and know none real intimately.

SOME REPRESENTATIVE PENNSYLVANIA FOREST TREES.

A small number of Pennsylvania forest trees have been selected for special consideration in this booklet. They are fairly representative trees and possess some striking and interesting characteristics. There are many other equally interesting and important trees which may be considered in later editions. The trees that will be described are:

1. White Pine
2. Red Pine
3. Pitch Pine
4. Short-leaf Pine
5. Jersey or Scrub Pine
6. Table Mountain Pine
7. Buttonwood
8. Sassafras
9. Red Mulberry
10. Sugar Maple
11. Red Maple
12. Silver Maple
13. Ash-leaved Maple
14. Striped Maple
15. Mountain Maple
16. Norway Maple
17. Sycamore Maple.

THE PINES OF PENNSYLVANIA.

Six different kinds of pine trees are native to Pennsylvania. One or more of them occurs in every county of the state, but only the white pine and the pitch pine have a wide distribution. The other four native pines have a rather restricted range.

In the winter months, there is something cheerful and lively in the appearance of the pines in spite of the cold and the snow. They may readily be distinguished by their leaves which are needle-like, occur in clusters of 2, 3, or 5, and persist throughout the winter. The latter characteristic places them among the evergreen trees.

The 34 different pines which are native to North America are classified into two groups, namely, Soft Pines and Hard Pines. Of the pines native to Pennsylvania the white pine alone belongs to the Soft Pine group, the other five species belonging to the Hard Pines.

In order that the pines of Pennsylvania may be recognized by every boy and girl, two simple keys have been prepared, the one based on leaf characteristics and the other on cone features.

LEAF KEY OF PENNSYLVANIA PINES*

1. Leaves slender, 5 in a cluster ....White Pine
1. Leaves usually stiff, 2 or 3 in a cluster 2

2. Leaves 3 in a cluster ....Pitch Pine
2. Leaves 2 in a cluster 3

3. Leaves 5 to 6 inches long............Red Pine
3. Leaves 4 inches or less in length 4

4. Leaves stiff and very sharp-pointed............
Table Mountain Pine
4. Leaves slender to slightly stiff, dull-pointed 5

5. Leaves twisted, stout, 1½—3½ inches long............
Jersey or Scrub Pine
5. Leaves straight, rather slender, about 4 inches long
(sometimes 3 or 4 in a cluster,......Short-leaf Pine

CONE KEY OF PENNSYLVANIA PINES

1. Cones 5 to 10 inches long ....White Pine
1. Cones less than 4 inches long 2

2. Cone scales not armed with prickles or spines............
Red Pine
2. Cone scales armed with prickles or spines 3

3. Cone scales armed with prickles 4
3. Cone scales armed with stout spines ....
Table Mountain Pine

4. Cones narrowly and sharply conical when closed
Jersey or Scrub Pine
4. Cones broadly and bluntly conical when closed......5

5. Cone scales thickened at apex and armed with short,
rigid and recurved prickles ....Pitch Pine
5. Cone scales slightly enlarged at apex and armed
with weak prickles which may fall off early
Short-leaf Pine

WHITE PINE

The discovery of the white pine, which is the prince of all the forest trees of eastern North America, coincides with the landing of the Pilgrims on the bleak coast of New England. It was one of the few green things which greeted them, and it truly made a lasting

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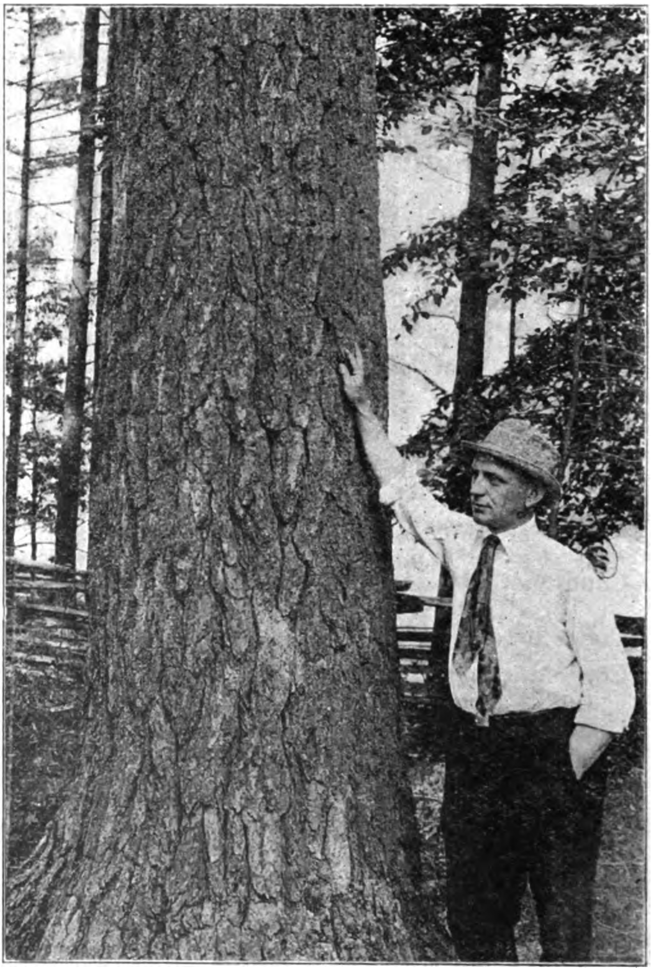
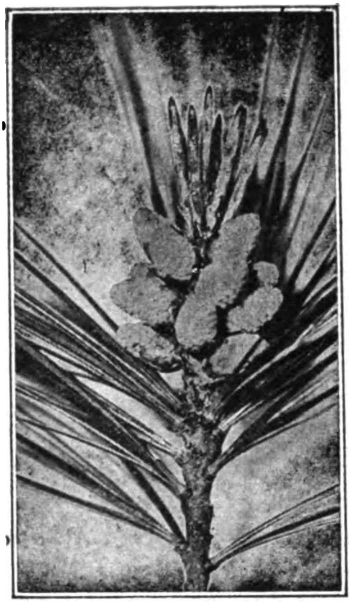
*One of the best methods of identifying trees is by the use of a key. The accompanying keys are simple in their make-up and may be used with little effort. They consist of alternative characteristics of trees made up in pairs and stated in two paragraphs preceded by the same number. Hence, if the characteristics of the tree to be identified do not fit the first paragraph, then they will correspond to those given in the second paragraph, or else the tree in question does not belong to the group considered in the key.

The two companion paragraphs of alternative characteristics are followed either by the name of a tree or by a number. If the name of a tree follows then it is the tree in question; if a number follows then it directs you to two companion paragraphs further on in the key preceded by that number. For example, if you find a pine tree in Pennsylvania with three needles in a cluster you may identify it by the use of the leaf key in the following way: Read the two statements of characteristics preceded by the number "1." The characteristics do not fit the first paragraph but will come under the second paragraph which is followed by "2." This directs you to the two paragraphs preceded by 2; of these the characteristics fit the first and not the second paragraph. Therefore, the tree in question is Pitch Pine, which name follows the first paragraph preceded by the number "2."



OUR NATIVE WHITE PINE MAY BE RECOGNIZED BY ITS DEEPLY-FURROWED BARK.



A CLUSTER OF POLLEN-BEARING BLOSSOMS OF THE WHITE PINE GROUPED BETWEEN THE NEW AND THE OLD NEEDLE CLUSTERS.

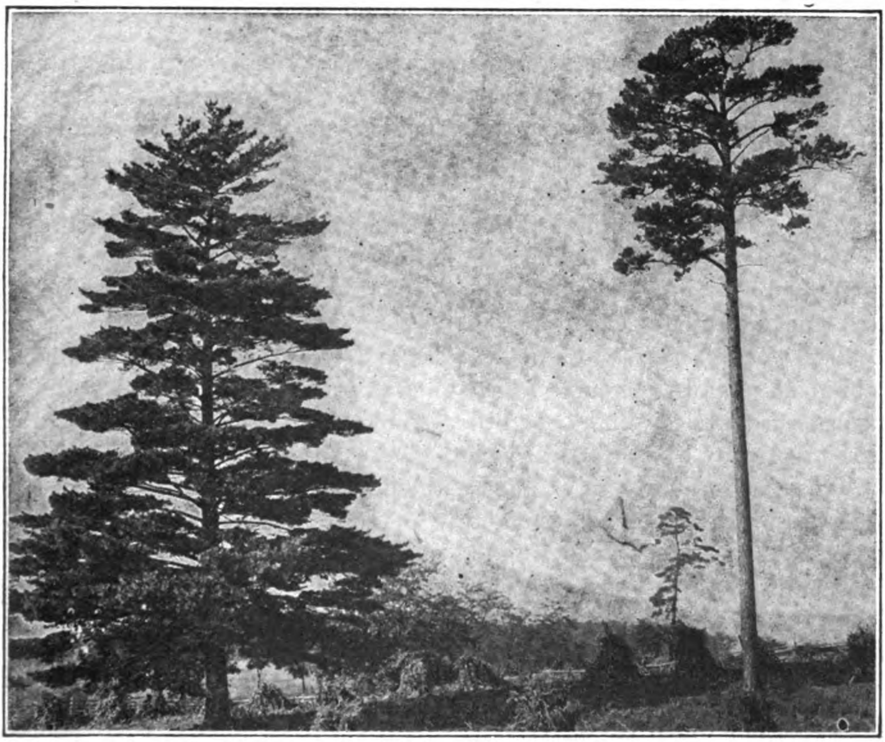


Photo by J. S. Illick.

PINE TREES MAY BE RECOGNIZED BY THEIR FORM.

and favorable impression upon them and those who came after them. There is no tree in the civilized part of the World which surpasses it in beauty, stateliness, individuality and usefulness.

Many years passed before the entire range of the white pine became known. As the pioneers pushed forward they found that this valuable timber tree had limits. In some localities it was abundant, in other places it was rare, and as they passed beyond the Allegheny Mountains it ceased to be a part of the forest. Now we know that it is found only in the eastern part of North America, extending northward as far as Newfoundland and the northern shore of the Gulf of the St. Lawrence, westward to Manitoba and Minnesota, and southward to northern Illinois and Pennsylvania and along the Alleghenies to Georgia.

In Pennsylvania the white pine originally formed dense stands, especially in the central and northern parts of the State. Many lumbermen claim that the best and most valuable stands of timber found in the whole United States east of Idaho occurred originally in northern Pennsylvania, and consisted of white pine and hemlock. White pine is still common in the mountainous part of the State, occurs sparingly in the western and southeastern parts, and rarely found in the agricultural valleys such as the Lancaster, Lebanon, Chester, Cumberland, Lower Lehigh, and Lower Delaware Valleys.

The white pine is one of our trees which may be recognized without much effort. It is the only evergreen tree native to eastern North America which has its soft, flexible, and bluish-green needles arranged in clusters of five. The lateral branches occur in whorls of 3 to 7 arranged in distinct horizontal layers. After the branches fall off they leave distinct circles of branch-scars along the stems. The cones are 5 to 10 inches long, attached to the twigs by a short stalk, rarely hang long upon the trees, and are covered with thin, flat and unarmed scales.

The wood is soft, straight-grained, and works easily. It weighs about 25 pounds per cubic foot, and was formerly used for a wider range of purposes than any other American wood. It is adapted for practically all purposes except where strength, hardness, flexibility, and durability in contact with the soil are required.

Sawmills began the manufacture of white pine lumber in 1623, and in 1635 a cargo was shipped to England from Massachusetts. Authentic records show that the first house built in America was constructed of white pine. In fact, the wood of this tree held such a prominent place in the lumber industry of America until about 1890 that the history of its exploitation was essentially the history of the whole lumber industry.

The white pine is the most important forest tree in eastern North

America, and probably in the World. It was introduced into England by Lord Weymouth and shortly afterwards into continental Europe, where it has been propagated so extensively that it is no longer regarded as a foreigner but as a naturalized member of their forests.

The white pine promises to become more abundant again, for it is being planted extensively and the remaining natural growth is now given better protection from forest fires and other destructive agents. Since 1902 over 25 million small white pine trees have been planted in Pennsylvania, and during the planting season of 1918 alone over 4 million seedlings and transplants were set out in the Keystone state. They are raised from seed produced in cones on mature trees. At the base of each cone scale two seeds with long brown paper-like wings are produced. The seeds are small in size and brown in color. It takes from 25,000 to 35,000 seeds to make a pound of clean seed. A pound of white pine seed is sufficient to sow a forest tree nursery bed of 100 square feet, and if all goes well, such a bed will produce 10,000 to 15,000 two-year old seedlings.

Many of these baby trees were set out by school boys, school girls and by Boy Scout organizations. Tree planting by boys and girls should be encouraged. It is a pleasant pastime and a useful practice. Their growth will visualize the building-up process in nature and be an excellent counter-part to the tearing-down operations which were impressed so vividly upon all of us during the recent world war.

PITCH PINE

Pitch pine possesses more common names than any other pine native to Pennsylvania. It has at least a dozen of them. Some of them are pitch pine, jack pine, hard pine, yellow pine, torch pine, nigger pine, black pine, scrub pine, long-leaved pine, rich pine, and fat pine. The scientific name of pitch pine is **Pinus rigida.**

Most of the common names refer to some distinctive feature of the tree or its wood. The name black pine and nigger pine refer to the dark bark frequently found upon large trunks. The name torch pine was given to it because it supplied the early settlers with pine knots used as torches about the primitive cabins and for traveling at night. The name yellow pine refers to old and mature trees that have replaced their typical blackish bark with yellowish bark. The names rich pine and fat pine are used locally. The backwoodsmen of Pennsylvania used these names because many of the old trees are rich or fat with resin. The name long-leaved pine is quite appropriate when one considers only the pines of the northeast, for some pitch pine trees develop needles much longer than any of our other native pines. It is not unusual to find trees with needles six or more inches in length.

The pitch pine, next to the white pine, is the easiest of the pines native to Pennsylvania to recognize, for it has positive distinguishing characteristics. Its needles are from three to five inches long and occur in bundles of three. The other hard pines of Pennsylvania have their needles in bundles of two and they vary greatly in length and texture from those of the pitch pine.

The bark of the pitch pine is ragged in appearance and breaks up into irregular plates separated by rather conspicuous furrows. Early in the life of a pitch pine tree the bark becomes quite thick, and after the sapling stage is reached the trees are fire-resistant. This thick bark accounts for the fact that the pitch pine is the most fire-resistant evergreen tree of the East. Forest fires will kill small seedlings, but as soon as the trees reach the sapling stage they develop a heavy bark. Severe forest fires have burned over extensive forest areas, and it appeared as if every living thing had been killed, but upon examining the area a year after the fire, one is often amazed to find that many of the medium-sized and larger pitch pine trees have withstood the extreme heat and are still growing.

Pitch pine does not present a neat appearance, but it is a rather picturesque tree. Its crown is irregular in outline and the trunk is often covered with gnarled branches, and occasionally with dense mats of leaves. It is the only Pennsylvania pine that produces these dense mats of leaves along the main stem, which occasionally envelop the trunk completely.

The cones of pitch pine are from two to two and one-half inches long. They are spherical to ovate in outline when open, persist for many years, and sometimes occur in dense clusters. A few years ago the writer found a cluster of nineteen cones on a small branch upon a young tree in Franklin County, Pennsylvania. Trees loaded down with thousands of cones are common. They may become a burden to the tree, and sometimes prove fatal, for during heavy snow storms the cones make an excellent place upon which the snow accumulates, and it is not unusual for it to collect in such large quantities that the branches break off and sometimes the entire crown is crushed completely.

The pitch pine is found from New Brunswick to Lake Ontario on the north, and south to Virginia, and along the mountains to Georgia, Kentucky, and Tennessee. It is probably the most widely distributed pine in Pennsylvania. It was originally less common than the white pine, but since the great lumbering days, during which the white pine was cut out, the pitch pine has been on the rise. It is found in every county in the State, but is commonest in the mountainous regions where it is associated with the rock oak and chestnut.

There are some excellent stands of pitch pine in Pennsylvania, and it is quite probable that within this State are found some of the best stands in the entire range of the tree. The pitch pine trees of Mont Alto, in Franklin County, Snow Shoe, in Centre County, and selected stands in Pike and Clearfield Counties are hard to surpass. From a commercial point of view, the pitch pine is not so important a tree as the white pine, but it is gaining favor for new and better uses are continuously being found for its wood. In the early days, when white pine was plentiful, no one cared to handle the inferior pitch pine wood, but conditions have changed and now it is looked upon with favor for many uses. It has won a place in our markets and in time it will move forward to a better position. It seems fair to assume that the wood of this tree will improve in quality when the trees are raised under good forest conditions.

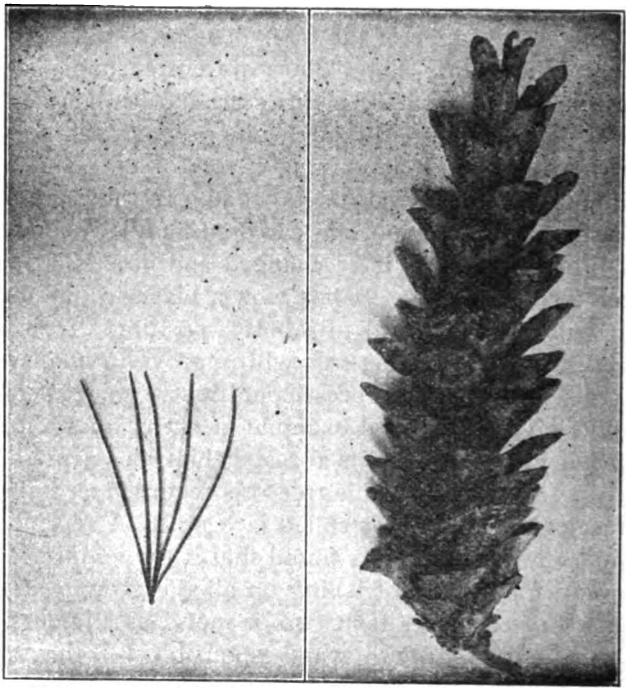
Pitch pine gives us a good example of a tree that should not be condenmed before studying its forest habits and growth peculiarities. Until a few years ago this tree was regarded as a slow grower, and because of this belief was called jack pine. A special study was made of its growth, and it was found that it grew more rapidly than was apparent, for instead of laying on all the growth of the season at one time it often places it in two or more installments. This installment method of growth was responsible for the false notion that it grew slowly.

The wide natural distribution of pitch pine in Pennsylvania,—its fire resistance,—and the fact that it is well adapted to our mountain soil,—recommend it as an important forest tree of Pennsylvania. While it appears to be an ordinary tree, yet it has so many good points that its importance and value will increase as the practice of forestry becomes more firmly established.

RED PINE

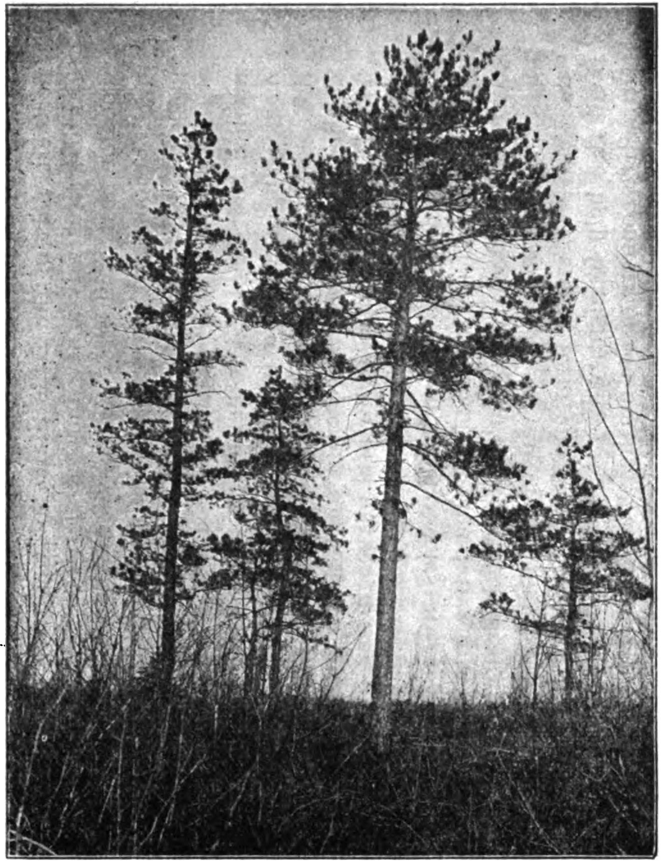
The red pine is a valuable timber tree. It has a number of common names. Probably the one used most frequently is Norway pine, a name wholly out of place because it is neither a native of Norway nor does it bear any resemblance to the pine trees of Norway. It is reported that the name Norway pine was given to this tree by a Spanish sea captain who thought this tree resembled pine trees he had seen in Norway. This supposed resemblance is responsible for the inappropriate name of Norway pine which has persisted until to-day and will no doubt continue for a long time, in spite of the fact that it is meaningless and misleading. Another common name is red pine. This is an appropriate name for the bark of the tree is reddish in color and the heartwood is usually pale red. The scientific name of red pine is **Pinus resinosa**, and means resin pine. This name is also inappropriate for its wood contains little resin in comparison with that of other pines.

The red pine is a native of the Northwoods. It extends as far south as central Pennsylvania and the Lake States. It reaches a



THE WHITE PINE HAS A DISTINCTIVE CONE AND ITS NEEDLES OCCUR IN CLUSTERS OF FIVE.

THE OLDEST WHITE PINE PLANTATION ON THE STATE FORESTS OF PENNSYLVANIA. THE TREES HAVE BEEN NUMBERED AND A



RED PINE HAS A DISTINCTIVE FORM. THE NEEDLES ARE CLUSTERED OR TUFTED AT THE ENDS OF THE BRANCHES.

PROBABLY THE LARGEST SPECIMEN OF TABLE MOUNTAIN PINE IN THE WORLD. IT IS 73 FEET HIGH, 23 INCHES IN DIAMETER AT BREAST-HIGH, AND FROM BRANCHES FOR A DISTANCE OF 40 FEET FROM THE GROUND. IT GREW AMONG HARDWOOD TREES ON A HILLSIDE NEAR MONT ALTO, FRANKLIN COUNTY, PA.

height of 70 or 80 feet and a diameter of 3 feet. In some parts of its natural range it attains an even greater size, and, as a rule, it is mixed with other trees. The optimum growth of this tree is in the northern part of the Lake States and in the southern province of Canada. Recently a new outpost of red pine was found on a farm woodlot near Selinsgrove, in Snyder County, Pennsylvania. This new station is 75 miles south of the most southern station of red pine that was ever reported.

Probably the most distinctive features of the red pine are its needles and cones. The needles are slender, flexible, from 4 to 6 inches long, and occur in clusters of two. They are surrounded at the base by a thin membranous covering or paper-like wrapper. The needles are grouped together in tufts at the ends of the branches. This characteristic is very helpful in recognizing the tree from a distance. The cones are about 2 inches long. They occur at the end of the season's growth and their scales are not armed with any spines or prickles. It is the only pine native to Pennsylvania whose cone-scales are unarmed. In addition to the leaf and cone characteristics, which should enable anyone to identify it at all seasons of the year, its general form and appearance and its distinctive bark will also help to identify it. It is unquestionably one of the most attractive conifers of the northeast and is being planted extensively for ornamental purposes.

The red pine is one of the most important timber trees of Pennsylvania, and as time goes on its real merits will become better known. It is not so abundant now in Pennsylvania as it was originally, for practically all the big trees have been cut out, and only a limited number of young trees have followed after the old veterans. The hope of having red pine in Pennsylvania in the future lies not in the natural growth that is coming on, but in the trees that are being planted. During the past ten years more than 1,000,000 red pine seedlings and transplants were planted on the State Forests of Pennsylvania and about 700,000 more were supplied by the Department of Forestry to private planters throughout the State. This does not include all the red pine trees planted within the State, for additional trees were purchased from nurseries and planted on private forest land. It seems fair to estimate that at least 2,000,000 red pine trees have already been planted in Pennsylvania and most of them are growing rapidly.

This valuable and promising forest tree should be carefully protected and its range extended by planting seedlings and transplants on the large areas of devastated mountain land in Pennsylvania. It has few enemies, grows rapidly, and if planted and protected will produce large quantities of high grade wood which is now urgently needed by our industries and homes.

SHORT-LEAF PINE

The short-leaf pine has more than a dozen common names. Some of them are appropriate, while others are misleading, and may embarrass one who attempts to identify it. The scientific name of the short-leaf pine is **Pinus echinata.** Of its fifteen common names none will ever replace short-leaf pine, for the leaves of this tree are truly short in comparison with those of the longleaf pine and other pines with which it is associated. Its distinctive leaves are from two to four inches long and usually occur in pairs, but occasionally three appear in a cluster, and sometimes four may be found in a group.

The cones of the short-leaf pine are rather distinctive. They are brown in color, from one and one-half to two and one-half inches long, nearly as wide as long when open, and attached to the branches by a short stalk. Each cone-scale has an enlarged end, which is armed with a weak prickle. Early in autumn the cones open to diccharge the small triangular seeds which are produced in large numbers and scattered widely about the trees. Heavy seed crops occur at rather short intervals, which justifies one in being hopeful that nature will continue to propagate this important forest tree. Even as far north as southern Pennsylvania a large number of seedling trees are found in openings about older trees.

One of the best distinguishing characteristics of the short-leaf pine is its clean, stately, and slightly tapering, trunk—the bark of which is marked off by deep furrows into irregular or rectangular plates covered with thin scales. Some of the old specimens have been appropriately called "armored knights of the forest," for the bark is so distinctive and the tree trunk so impressive that the tree cannot be confused with its associates.

Short-leaf pine is found over an area of more than 440,000 square miles, but is of commercial importance over about two-thirds of its natural range. Its natural range extends as far north as western Connecticut, but near Mont Alto, in Franklin County, Pennsylvania, is the most northern heavy stand of short-leaf pine in America. In this stand are many stately trees with trunks two and one-half feet in diameter at breast high, and clear of branches for sixty feet from the ground. These magnificient trees are covered with a distinctive armored bark fully as typical as any grown in the south.

The short-leaf pine is commonest in the South, where it makes its best growth at elevations of 400 to 1,500 feet above sea level. It is, however, found from sea level to an altitude of 3,000 feet in the southern Appalachians. The commercial range of short-leaf pine has contracted considerably since the settlement of our country. It once grew as far north as Albany, and from fifty to one hundred years ago it was lumbered in many places in Pennsylvania where it has now ceased to exist or only a few scattered trees remain. The geographical range is now given as from New York to Florida, west to Missouri, Oklahoma, and northeastern Texas.

In Pennsylvania the short-leaf pine occurs only locally. There is only one heavy stand in the State and that is found near Mont Alto in Franklin County. A few trees are found locally throughout the southeastern part of the State, and scattered specimens have been found as far north as Lycoming County, where it is reported that the tree was formerly far more abundant than it is now. It may be said that the tree is practically extinct in Pennsylvania excepting in local places in the southern and southeastern part of the State. The hope of keeping this important timber tree as a member of the forests of Pennsylvania is in the fact that a considerable number of young trees are beginning to appear about the few old trees that still remain, and a considerable number are being planted for reforestation. In the fall of 1921, 140 pounds of seed were planted in the Mont Alto nursery operated by the Pennsylvania Department of Forestry. With 50,000 to 60,000 seeds to each pound, there should result from this seed sowing at least two million seedlings.

The short-leaf pine is a companionable tree. One may find small forest areas occupied by it exclusively, but in the most of its range it is associated with hardwoods or other evergreen trees. Among its companions are pitch pine, scrub pine, and occasionally loblloly pine. At high elevations the white pine and table mountain pine stand by its side. Many kinds of hardwoods, such as oak, hickory, sassafras, ash, and cherry, are also associated with it.

The wood of short-leaf pine is hard, strong, and yellowish to dark brown. It weighs about forty pounds to the cubic foot and is used extensively for a large number of purposes. It is in great demand by builders of freight cars, large quantities are used for general construction work, and box and crate makers employ large quantities.

Short-leaf pine has been an important timber tree for many years, and everything points that it will continue to hold a place in the forest structure of southern and southeastern Pennsylvania. It attains a size sufficiently large for forestry purposes, produces excellent wood, yields large quantities of resin, and is well adapted to the climate and soil conditions in the forest regions of southern Pennsylvania and the south Atlantic States.

Every boy and girl interested in outdoor life will do well to try to locate a specimen of short-leaf pine in the natural forests of Pennsylvania and then become its protector. If no specimen can be found in the woods, you can satisfy your desire to perpetuate this wonderful tree of the southland by planting a number of young seedlings and then watch them grow year by year into stately forest trees.

SCRUB PINE

The scrub pine is unfortunate in its common names. The word "scrub" implies that the tree is undesirable as a forest tree and produces inferior wood. The wood is inferior to that of white pine and some of the other important pines, but this does not necessarily mean that it is not satisfactory for use in wood-using industries. Each year the wood of this tree is being used more extensively for pulp, shipping crates, and general construction work. A few years ago more than 20,000 board feet of lumber were cut from trees of this species in the woodlot of Colonel Henry W. Shoemaker near McElhattan, in Clinton County, Pennsylvania, and used in the construction of one of the most attractive and substantially constructed barns of northern Pennsylvania.

The scrub pine is also called Jersey pine, because it was at one time reported as abundant in parts of New Jersey, where pine forests covered extensive areas known as the "pine barrens." Recent studies, however, show that most of the trees in the pine barrens are pitch pine and not scrub pine. Another common name applied locally to this tree is "slate pine." This name is used widely in southern Pennsylvania where this tree frequently occurs on slaty or shale soil. The scientific name of scrub pine is **Pinus virginiana.**

Scrub pine has many striking distinguishing characteristics. Its needles occur in pairs. They are twisted, spread widely from each other, and are from two to three inches long. These short needles are responsible for the common names "short-leaved pine" and "shortshat pine." No other Pennsylvania pine has needles which are so short, so twisted, and spread so widely. If one takes a position under a scrub pine tree and looks up into its crown, the light seems to be uniformly screened by the evenly distributed short needles. This type of leaf distribution is entirely different from some other pines, particularly the red and pitch pines which have their needles clustered or tufted at the ends of the branches.

The branchlets also have a distinctive feature. They are smooth, purplish, tough, and usually wavy—not stiff and straight as those of the other pines. The bark of the trunk is smoother and redder in color than that of any other native pine. Upon the older trunk the bark peels off in thin scales, giving the trunk a ragged appearance. The cones are narrow and conical, rather sharp-pointed, and often persist for several years. They are helpful in recognizing this small and distinctive forest tree.

The occurrence of the scrub pine may also be helpful in recognizing it. It is neither a tree of the coastal plains nor of the high mountains, but prefers the rolling uplands between these two extreme positions. It is found from southeastern New York and Pennsylvania south to Georgia and Alabama, and west to Indiana and Kentucky. In Pennsylvania it occurs locally throughout the southern part of the State, and extends as far north as Allegheny County in the western part, Clinton and Lycoming Counties in the central part, and Northampton County in the eastern part.

The scrub pine may be regarded as a pioneer tree, for it is one of the first of our forest trees to march out from the forest and reclaim abandoned fields. There are thousands of acres of farmland in southern and central Pennsylvania abandoned within the last thirty years and now being occupied rapidly by the scrub pine. This tree cannot be placed in the class with the forest giants or sylvan monarchs, but it reaches a height of eighty feet and a diameter of two feet. Usually mature trees are from thirty to forty feet high and have a diameter of eighteen inches. The largest specimen reported in Pennsylvania has a total height of 82 feet and a diameter of 28 inches at breast-high.

TABLE MOUNTAIN PINE

The table mountain pine is the least known of the pines of Pennsylvania. For a long time it was thought that this tree occurred only upon the high tablelands of the southern Allegheny Mountains; but in 1863 a few specimens were found in central Pennsylvania by the late Dr. J. T. Rothrock while tramping over the hills of his native State with his teacher, Dr. Asa Gray—the world-famed botanist of Harvard University. Now this tree is known to occur in many places within the State as far north as Clinton and Union Counties, and northeast to Berks and Schuylkill Counties. These are the most northern outposts that are now known in the tree's entire natural range.

Each year new places are found within the State where the table mountain pine is growing. These new reports may be appearing because the tree is found chiefly in remote and inaccessible situations, which have been little explored by naturalists. The boys and girls of Pennsylvania should get much pleasure by organizinz clubs to go out and find new stations of this rare tree. In order to be successful in this exploration work, it is necessary to go to the rough and rugged mountain tops and ragged cliffs, for it is in such situations that this tree is usually found.

The table mountain pine is also called poverty pine, because it grows and usually thrives on poor, rocky and shallow mountain soils. The scientific name of this pine is **Pinus pungens.** It is an aggressive tree and consequently becomes a good competitor with other trees upon poor soil and exposed situations upon which it sometimes occurs in pure stands. This mountain tree, however, makes its most rapid growth and develops its best form when standing in mixtures with hardwood trees upon rather fertile soil. What is probably the largest table mountain pine tree ever recorded in the World grew upon a mountain side near Mont Alto, Franklin County, Pennsylvania. This specimen was seventy-three feet high, twenty-three inches in diameter at breast-high, and free from branches for a distance of forty feet from the ground.

While the table mountain pine is typical of our highland forests, it is also found locally at low elevations. A few years ago the writer found a considerable number of trees of this species growing upon an island in the Susquehanna River below McCall's Ferry in Pennsylvania at an elevation of only about two hundred feet above sea level. The roots of the trees are washed continuously by the flowing water—a habitat so different from that upon which they usually occur. Specimens of this tree were also found upon other nearby islands and on the adjoining river hills of York and Lancaster Counties.

Few trees are easier to identify than the table mountain pine. Its needles, which are present at all seasons of the year, occur in pairs. They are very stout, stiff, and extremely sharp-pointed. No other pine tree native to eastern North America has such sharp-pointed needles. The cones of this tree are equally distinctive. They are coarse in appearance and bear cone scales which are armed with stout spines. They are from three to four inches long and usually occur in clusters of three, five, seven, or even more. These distinctive cones often persist for many years and cannot be confused with those of any other cone-bearing tree of the eastern United States.

The preference of this tree for poor rocky soil, and exposed situations, may also help to identify it, for it is found only from Pennsylvania south along the mountains to North Carolina and northern Georgia. When grown in the open its lateral branches persist on the main stem down to the ground, but if grown in dense stands the trunk is free from branches for a considerable distance from the ground, and the wood of such forest-grown specimens is satisfactory for general use.

The table mountain pine cannot be classified as a commercial timber tree of great importance, but it should not be despised, for like all other trees it has some merits. As the practice of forestry becomes more intensive, this tree will be utilized in protection forests on steep mountain slopes where it will help prevent erosion and assist in building up better forest conditions, and while it is doing this it will produce wood that can be used for a large number of ordinary purposes.

BUTTONWOOD OR SYCAMORE

Our native buttonwood tree belongs to the plane tree family. Only three different kinds of buttonwood tree are native to the United States. All of them attain tree size and belong to a group known by the technical name **Platanus**, which means "broad" and refers to the width of the leaves. The leaf-blades are not so broad as those of some tropical trees, but they are among the broadest found in temperate regions.

Probably no person with a practical knowledge of trees ever confuses the buttonwood with any other native forest tree. Notwithstanding the individuality of the tree, it has a good many common names. It is generally known as buttonwood in most of the New England and Middle Atlantic States, but it is also frequently called sycamore. In several of the eastern States, and occasionally in the Mississippi Valley, it is called buttonball, and locally in eastern Pennsylvania and in Delaware the name water beech is given to it. Ever since the closely-related oriental plane tree has been introduced on an extensive scale for ornamental planting, our native buttonwood tree is sometimes spoken of as the plane tree. The scientific name of our native buttonwood is **Platanus occidentalis.**

Our native buttonwood is found from Maine to Ontario and Nebraska, and south to the Gulf States, and west to Texas. It prefers moist, fertile soil but will grow in dry places. In Pennsylvania it is common along the streams and in other wet places in the eastern, southern, central, and western part of the State, but it is rare to absent on dry situations and in the high mountains.

The buttonwood stands out among our forest trees in that it casts its bark as well as its leaves. All trees do this to a greater or less extent, for it is a necessity of life that the bark yield to the pressure of the growing stem from within. Bark shedding is not hidden in the case of the shagbark hickory, silver maple, and ironwood, but the buttonwood is even more open in exhibiting its ability along this line than any other forest tree.

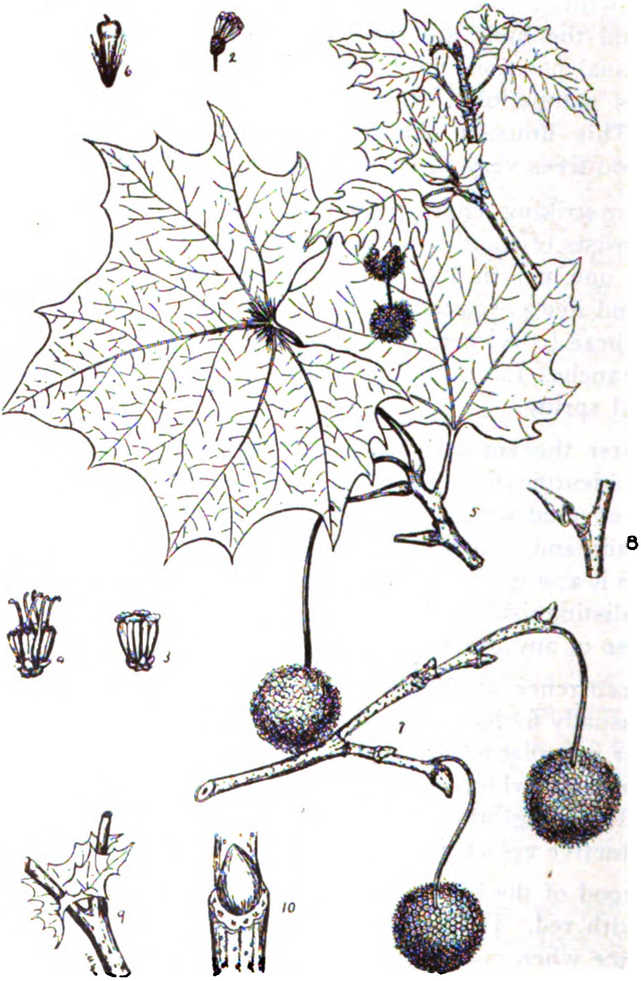
The most striking distinguishing characteristic of our native buttonwood is its thin, smooth, whitish, or pale green bark on young trunks resembling a crazy patchwork of white, green, yellow, and brown. In winter, the predominant color is white, while in summer there is a tendency towards green and brown. The leaves are simple, usually heart-shaped at the base, and wavy on the margin. They are from three to seven-lobed, and hairy or wooly on the lower surface. The most distinctive feature of the leaf is the enlarged or swollen base of the leaf-stalk. In late summer, just before the leaves begin to fall, one of the delights of the country boy is to ask his playmates to find buds on the buttonwood tree. A superficial examination of the twigs causes one to conclude that this tree bears no buds, but a little bit of patience and a somewhat closer examination of the twigs will reveal that the buttonwood does have buds, and that they are hidden entirely under the enlarged stalks of the leaves. Nature seems to have provided a protective cover for the tender buds until they are fit to withstand the cold of late autumn and early winter. As soon as the buds are hardened up, the leaves fall off and the buds are ready for winter exposure. Because of their unusual position, the buds of buttonwood trees are often described as **sub-petiolar**, which means "under the petiole or leafstalk." This unusual characteristic enables anyone to identify buttonwood trees very easily during autumn and the winter months.

Another striking characteristic of the buttonwood is its fruit, which consists of small balls suspended on slender stalks. The balls are about one inch in diameter, and composed of a large number of slender and densely-packed seeds. One ball contains thousands of seeds. These balls ripen in late autumn, and may remain attached to the branches far into the winter, and some even hang on the trees until spring.

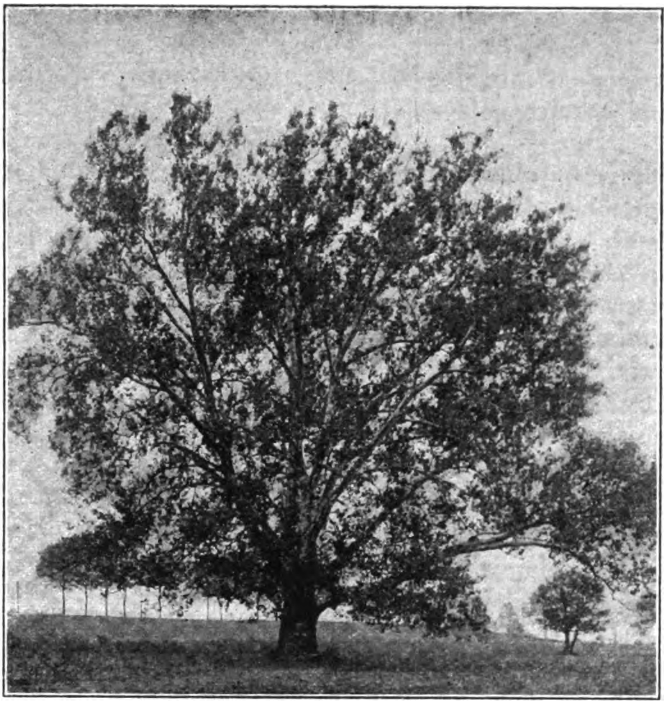
In winter the smooth, reddish-brown, pointed buds are a sure means of identification. They are completely surrounded by a leaf-scar and covered with a single bud-scale. If one takes a good look at the buds and winter twigs of a buttonwood, it will be easy to recognize it at any time during the winter months, for they are such positive distinguishing characteristics that they cannot be confused with those of any other associated forest tree.

The occurrence of the buttonwood is also helpful to identify it, for one usually finds it along the banks of streams, borders of ponds, and other wet places. In winter one often sees long wavy lines of sycamore trees which mark stream courses. They stand out conspicuously among other associated trees because of their white bark and distinctive crown forms.

The wood of the buttonwood is uniformly pale brown, somewhat tinged with red. It is a clean looking wood, and has an attractive appearance when manufactured, which accounts for the fact that it is extensively used in the manufacture of novelties and kitchen utensils. If one examines the numerous household articles offered for sale in a five and ten-cent store, it will be found that many of them are made of the buttonwood. Brush backs, mouse traps, kitchen utensils, and building blocks are among these articles. One of the most desirable characteristics of this wood is the fact that it neither stains or imparts odor or taste to substances that come into contact with it. The latest statistics show that more than 35,000,000 board feet of buttonwood are cut annually. About one-half of this amount is used in the manufacture of boxes and crates. It has



THE BUTTONWOOD OR SYCAMORE IS READILY RECOGNIZED BY ITS DISTINCTIVE LEAVES. PECULIAR BALL-LIKE FRUIT, UNIQUE BUDS AND UNUSUAL LEAF APPENDAGES.



THE GIANT DAUPHIN SYCAMORE.

It is over 25 feet in circumference at the base and stands as a memorial to John Goodway, the last of the friendly Indians of Central Pensylvania.

THE BARK OF THE SYCAMORE IS DISTINCTIVE.

It is a patch work of white, green, brown, and yellow.

long been the favorite wood for boxes for plug tobacco, which stains easily and acquires an unpleasant taste and odor from most other woods.

Our native buttonwood has many good points, but unfortunately it has a number of serious enemies. Among them is a blight which attacks the leaves shortly after they have started to develop in spring. When the leaves are about one-third grown, little brown to black dots begin to appear upon them. These dots enlarge rapidly, and sometimes within a few days the leaves are completely browned up and shriveled, and fall to the ground. The leaves appear to be injured by frost, but the real cause of the damage is the blight, for which no practical remedy has yet been found.

The buttonwood grows at its best throughout the Mississippi Valley, and it also reaches a large size along the main rivers and in the fertile valleys of Pennsylvania. There is a buttonwood tree standing near Linglestown, Dauphin County, Pennsylvania, known as the "Dauphin Sycamore." It has a circumference of more than twenty-five feet at the base, a branch spread of over one hundred feet, and is in a healthy condition. Local historians tell us that the tree stands as a memorial to John Goodway, the last of the friendly Indians that lived in central Pennsylvania. It is said that he is buried about one hundred yards north of this magnificient tree, which remains as a memorial to his otherwise unmarked grave.

Among the historic trees of Pennsylvania is a buttonwood growing near Chadd's Ford in Delaware County. It stands close by the house used by General Lafayette as his headquarters before the battle of Brandywine, September 11, 1777. This tree is about seven feet in diameter, well proportioned, and remains as a worthy memorial to the great general. Another large buttonwood stands in a field on the old Rothermel farm in Maiden Creek Township, Berks County, Pa. It is the biggest tree in Berks County, Pennsylvania. This tree is over thirty-seven feet in circumference near the ground, one hundred and three feet high, and has a spread of branches of over one hundred feet.

The buttonwood is the giant of all American hardwoods. A few years ago a large specimen was found near Worthington, Indiana. It measured forty-two feet and three inches in circumference at five feet above the ground, and is one hundred feet tall. It is not unlike other large sycamore trees in that it branches near the ground. Its east branch is twenty-seven feet and three inches in circumference, and its west branch twenty-three feet and two inches in circumference.

We are just beginning to know the real merits of our native buttonwood. It seems fair to predict that before long its wood will play a more important role in the lumber industry of America than it has in the past, and with a better understanding of its quality and fuller information about its growth peculiarities, this tree will begin to take a worthy place among our forest trees.

In addition to our native buttonwood or sycamore, another member of the family—native to southern Europe and western Asia—has been introduced extensively into Pennsylvania. It usually goes by the name "oriental plane tree." It has many good points and is being planted rather extensively for ornamental purposes. In the city of Philadelphia there are many specimens of it and most of them appear to be growing well. It grows rapidly, is hardy, possesses a beautiful crown, gives ample shade, has an attractive bark, and is troubled by only a few insects and fungi. It stands in the front rank among our shade trees, and in spite of its foreign origin has established itself firmly among our ornamental trees.

SASSAFRAS

Sassafras is the only tree of its kind in the United States. There is only one other kind of sassafras tree in the World. It is a native of China, and like our native sassafras belongs to the Laurel family. Our native sassafas is found from Massachusetts to Iowa and Kansas, and south to Florida and Texas. In Pennsylvania one rarely finds it in the high mountains, but it is a common lowland tree in the eastern, southern, and western parts of the State. One frequently finds it along fence rows and in abandoned fields where it sometimes forms extensive and dense thickets.

The sassafras was one of the first American trees that became widely known in Europe. The Indians told the early settlers about its medicinal bark and other properties, and the white man immediately attempted to commercialize its bark and other products. It is reported that sassafras roots comprised a part of the first cargo ever exported from Massachusetts. At present its medicinal properties are not prized so highly as in the early days, but its roots are still used in the preparation of "Sassafras tea" and in the manufacture of flavors for medicines and candy. It is a common practice among the mountaineers of southern Pennsylvania to grub out the roots, put them up in small bundles, and carry them to nearby market places where they are sold for a nickel or dime a bundle. Sassafras root collectors prefer to dig them up in abandoned fields and along fence rows where young trees come up in large numbers, often forming dense thickets.

The early inhabitants of Pennsylvania believed that the sassafras possessed miraculous healing properties. People then thought that sassafras could renew the youth of the human race. Even to-day this superstition still clings to this tree, and it is not entirely confined to ignorant people. Bedsteads made of sassafras are supposed to drive away nightly visitors that disturb peaceful slumbers. The negroes of the South prefer to floor their cabins with sassafras, for they believe that it will keep away animals that may molest them. They believe too that sassafras poles are superior to all other woods for chicken roosts. They are confident that the poles will stop all kinds of men and animals that may attempt to lift the chickens from their roosts.

The distinctive aromatic taste of the bark, roots, and wood, and the accompanying pleasant odor of the sassafras, are the best and most reliable means of identification. If one breaks off a brittle twig of green-barked sassafras, a pleasant aromatic odor is given out immediately, and upon chewing it the flavor of the mucilaginous inner bark is found to be very delicious.

Three distinctive forms of leaves are often present on the same branch. Sometimes an even larger number of leaf forms may be found. The leaves are all simple in form and alternate in their arrangement. The oval entire-margined form is commonest. In the mitten form the leaf has one thumb-like projection which may be either on the right or on the left side. Sometimes the leaves are prominently three-lobed, and occasionally five-lobed specimens may be found.

The fruit is a dark berry which is borne on bright red and club-like fleshy stems and arranged in rather open clusters. It furnishes excellent food for birds but unfortunately does not persist until winter when the birds are often in great need of something to eat.

Sassafras is not an important forest tree in Pennsylvania. It does not occur in every part of the State, for one rarely sees sassafras trees in the cold and mountainous parts of northern Pennsylvania. Near the northern limit of its range it is generally small, but farther south it becomes a large tree frequently 40 to 50 feet high and 1 to 3 feet in diameter. Occasionally a tree is found that is 100 feet high and 3 to 4 feet in diameter.

The largest sassafras tree that has ever been found in Pennsylvania stood in a cemetery at Horsham in Montgomery County. A group of four large sassafras trees are growing along a state road about one-quarter of a mile north of Wawa Station in Delaware County. One of them stands outside of the roadside fence and the other three within the fence. These four trees measure 10 feet 8 inches, 11 feet 8 inches, 10 feet 7 inches, and 10 feet 4 inches in circumference at three feet above the ground. Another large and historic sassafras tree stands near Second and Emerald Streets in Harrisburg. It is a real landmark for the tree is 209 years old. It is 56 feet high and 13 feet in circumference at the base. It was about 15 years old when John Harris—the founder of Harrisburg—was born. This tree is no longer thrifty, for most of its crown has disappeared.

The wood of sassafras resembles that of the Chestnut and it is often substituted for it on the market. In many localities sassafras wood is sought for the purpose of smoking meats, the claim being made that it imparts a very desirable taste. The wood is durable in contact with the soil and consequently used rather extensively for fence posts, rails, and occasionally it is manufactured into furniture. Sassafras wood is used more extensively than our records show for it is usually sold under other names. It is not unusual to find it listed under Ash, and when it is used in the manufacture of coffins it is listed as Chestnut.

There exists no good reason for believing that the sassafras will become extinct, for it produces seeds abundantly and the birds carry them into fence corners and scatter them in large numbers over pastures where the young trees often form dense thickets.

RED MULBERRY

The red mulberry, when first discovered in Virginia, inflamed the early colonists with great hopes, for they thought they had found a new source of food for the silkworm. Unfortunately, their great commercial dreams never came true, for the red mulberry was no satisfactory substitute for the white mulberry, the leaves of which were the chief source of food for the silkworms in Europe and Asia.

The red mulberry is the only mulberry native to the eastern United States. It is found from Massachusetts west to Kansas and south to Texas and Florida. Its best growth occurs in the lower Ohio Valley and the foothills of the southern Appalachian Mountains. Nowhere in Pennsylvania is the native mulberry abundant. but it is found locally in the fertile valleys and along the foothills in the eastern and southern parts of the State. It also occurs locally in the central part, but is generally absent in the cold and mountainous regions.

Being the only representative of its kind, it is not difficult to distinguish the red mulberry from our other forest trees. In summer the large, roundish, sharp-tipped leaves with deeply sunken veins on the upper surface are distinctive. Some of the leaves are lobed and resemble an ordinary mitten in outline. The best distinguishing characteristic of the leaves is the milky secretion given out by the leaf-stalks if pressure is placed upon them. Only a few other trees give milk, and they bear no resemblance to the red mulberry.

The flowers appear in spring when the leaves are about one-fourth developed. There are two kinds, namely, pollen-bearing and seed-producing. Both kinds occur in short tassels (catkins). The pollen-bearing and seed-producing occur separately, but may be found on the same or different trees. The seed-producting blossoms develop

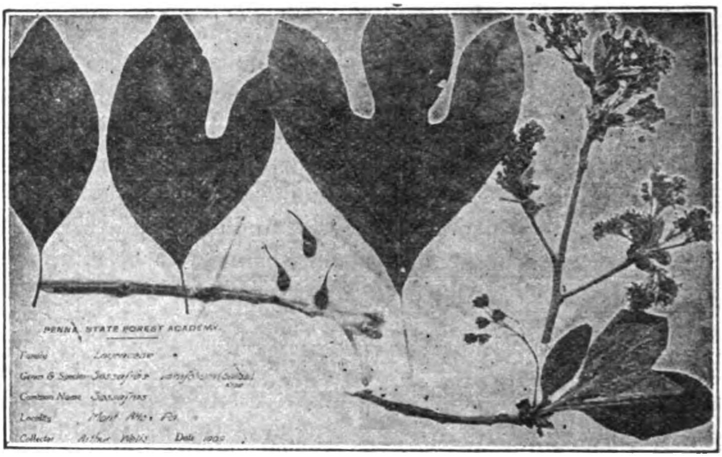

PENNA. STATE FOREST ACADEMY.
Family Lauraceae
Genus & Species Sassafras
Common Name Sassafras
Locality Mont Alto, Pa.
Collector Arthur Wells Date 1909

Photo by J. S. Illick.

SASSAFRAS.

Mature and immature (three forms) leaves, flowers, fruit, and a winter twig.

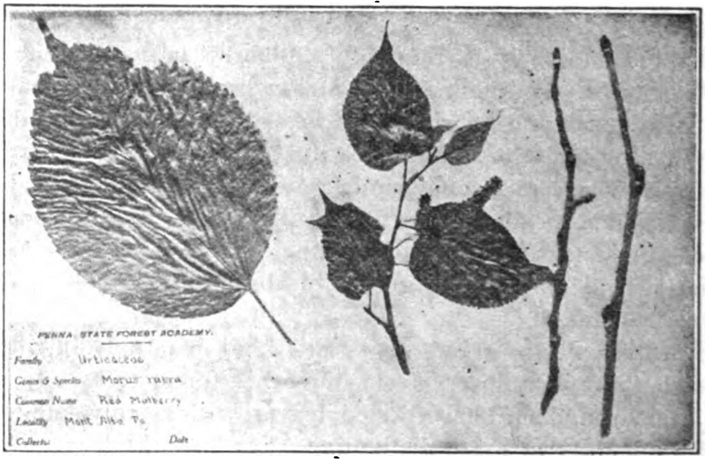
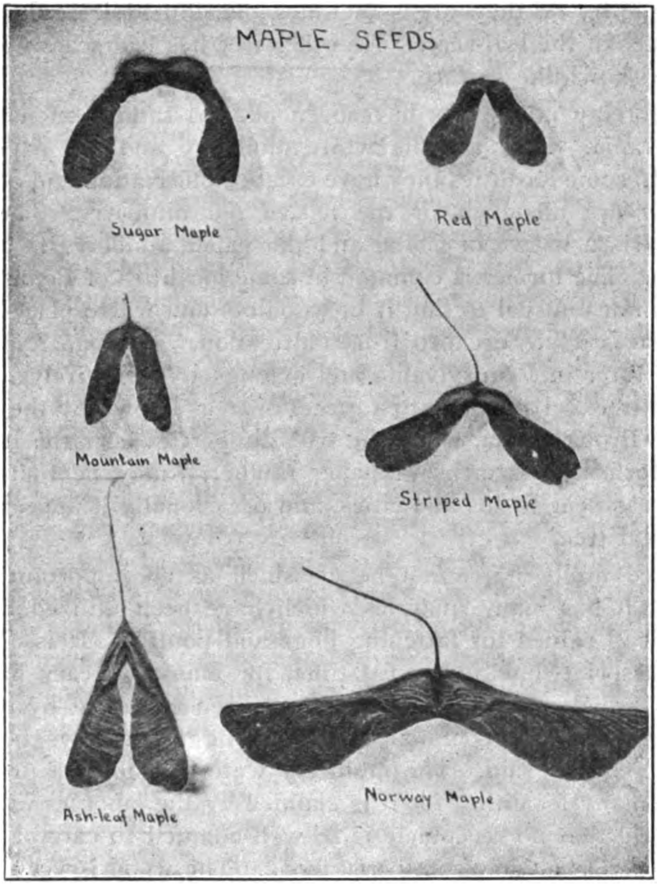


Photo by J. S. Illick.

RED MULBERRY.

Mature and immature leaves, flowers, and winter twigs.



FRUIT OF OUR COMMON MAPLES.

into purplish aggregate fruit which is the distinctive product of the tree. No other native tree produces a fruit which bears any resemblance to that of the mulberries.

In winter the red mulberry is not especially attractive, but it can readily be distinguished if its twigs are examined closely. They are very smooth, clean, and light-greenish brown. A milky juice comes out of them if they are cut. They bear oval and hollow leaf-scars which contain a large number of dot-like bundle-scars arranged in a closed ellipse, or they are sometimes distributed irregularly over the surface of the leaf-scars. No other tree has leaf-scars with such a hollow, bowl-like surface.

Two foreign mulberries have been planted rather extensively in Pennsylvania. They are the white mulberry and the paper mulberry. In some localities they have escaped cultivation and occasionally they are mistaken for the native red mulberry. The white mulberry is a native of China and the paper mulberry is a native of Japan. The former is common in some localities of Pennsylvania and it is not unusual to find it in woodlots and waste places, for in many places it has escaped from cultivation. The paper mulberry is much rarer in Pennsylvania. and belongs to an entirely different group of trees. It belongs to a group of trees known by the scientific name **Broussonetia,** while the true mulberries bear the technical name **Morus.** Specimens of paper mulberry may be found upon waste areas near towns and cities, and occasionally it appears as an ornamental tree.

The red mulberry cannot be classified as an important timber tree, but it has many qualities which have been utilized by man. The fruit is valued for fattening hogs and poultry. It is also intimately associated with harvest time, for many a weary harvester has found shelter under its crown, and been refreshed by its fruit. Mulberry trees are common objects along fence rows bordering fields of golden grain. The mulberry waterkeg holds a prominent place in many localities, for it is claimed by the laborers who work in the field that no receptacle is so well adapted to carry and keep water as a keg made of mulberry wood. The wood is very durable and used chiefly by boatbuilders, coopers, and implement makers.

THE MAPLES

The maples are among the best known trees in the Northern Hemisphere. They are abundant in China and Japan, common in Europe, and widely distributed in North America. There are seventy different kinds of maples known in the world. Thirty-five of them are native to China and Japan, and thirteen occur in North America. Six of the latter are native to Pennsylvania.

Japan is the ancestral home of the maples. It is said that one can find in the Island Empire of the Orient traces of the first maple tree that ever grew on the surface of the earth. For centuries the people of Japan have been breeding maples in order to develop varieties with unusual and unique characteristics. The development of pigmy maples is a real art in Japan. For cenuries they have been fashioning these miniature trees, and now there is an established custom in Japan to hold annual Maple Shows, which are in many ways similar to the Rose Shows of America.

While the Japanese maples excel in variety and uniqueness, the American maples are unrivaled in the World in size, beauty, and commercial value. No other group of our native trees show such a wide variation in form and structure as do the maples. They range in size from large commercial timber trees to small trees and shrubs. The leaves of many of them are simple but a few have compound leaves. The twigs of some are slender, while those of others are stout; their color may be green, gray, brown, or red. Maple flowers may occur in small lateral clusters, in long drooping tassels, or in erect spikes. On some maples the flowers appear before the leaves, while on others they appear with or after the leaves. The fruit of the maple is very distinctive. It consists of a pair of winged seeds which is called a maple-key. Each kind of maple tree bears its own distinctive key-like fruit, which can readily be distinguished from that of all other maples.

The maples occur on a wide range of habitats. The ash-leaved maple grows at its best along the streams and along the border of ponds and lakes. The sugar maple prefers well drained, rich soil. The striped maple is satisfied in shaded and moist places, while the mountain maple thrives on dry, rocky hillsides and mountain tops.

Of the thirteen maples native to the United States, nine occur east of the Rocky Mountains, and six of these are native to Pennsylvania. The six maples native to Pennsylvania are:

COMMON NAMES	SCIENTIFIC NAMES
1. Sugar Maple; Hard Maple.	Acer saccharum.
2. Silver Maple; Water Maple.	Acer saccharinum.
3. Red Maple; Soft Maple.	Acer rubrum.
4. Ash-leaved Maple; Box Elder.	Acer negundo.
5. Striped Maple; Moosewood.	Acer pennsylvanicum.
6. Mountain Maple; Spotted Maple.	Acer spicatum.

The maples as a group have so many different characteristics and such striking features that they can be distinguished with little effort from all other groups of trees at every season of the year. They are readily distinguished from other trees, but some of them are so closely related to each other that it is difficult to tell them apart. The following table gives the distinguishing characteristics of the four big maples of Pennsylvania:

HOW TO RECOGNIZE THE FOUR BIG MAPLES OF PENNSYLVANIA.

	SUGAR MAPLE	SILVER MAPLE	RED MAPLE	ASH-LEAVED MAPLE
LEAVES,	Simple usually 5-lobed, coarsely toothed, pale green on lower surface.	Simple, 5-lobed, silvery white on lower surface, leaf-clefts deep and round-based.	Simple, 3 to 5-lobed, whitish on lower surface; leaf-clefts shallow and sharp-pointed at base.	Compound, with 3 to 5 leaflets.
FLOWERS,	Appear with the leaves. Occur in drooping clusters.	Appear before the leaves. Occur in dense clusters along twigs.	Appear before the leaves. Occur in dense clusters along twigs.	Appear with the leaves. Occur in drooping clusters and spikes.
FRUIT,	Matures in autumn. Medium-sized maple key borne on long stalks and clustered.	Matures in early summer. Large maple key with rather divergent wings.	Matures in early summer. Small maple key, arranged in short lateral clusters.	Matures in late summer. Medium sized maple key with converging wings; arranged in long drooping clusters. May remain on trees over winter.
BUDS,	Brown, sharp-pointed, with 8 to 16 exposed scales. Occur solitary along twigs.	Red, blunt-pointed, clustered along twigs.	Red, blunt-pointed, clustered along twigs.	Short-stalked, blunt-pointed, white wooly; clustered along twigs, only a few bud-scales visible.
BARK,	Grayish brown on twigs, gray to black on main stem, not scaly.	Greenish to reddish brown on twigs, dark gray and scaly on main stem.	Reddish with white dots on twigs, grayish and somewhat scaly on main stems.	Smooth and purplish green on twigs, grayish brown and furrowed on main stem.

THE SUGAR MAPLE

The sugar maple is the best known hardwood tree native to eastern North America. It is found from Newfoundland to Manitoba and south to Florida and Texas. It occurs in every state east of the Mississippi, but is not abundant in the South. It reaches its best development from New England across New York and northern Pennsylvania to Michigan. All who have visited the northwoods know the beauty, stateliness, and healthy appearance of this prince among our forest trees.

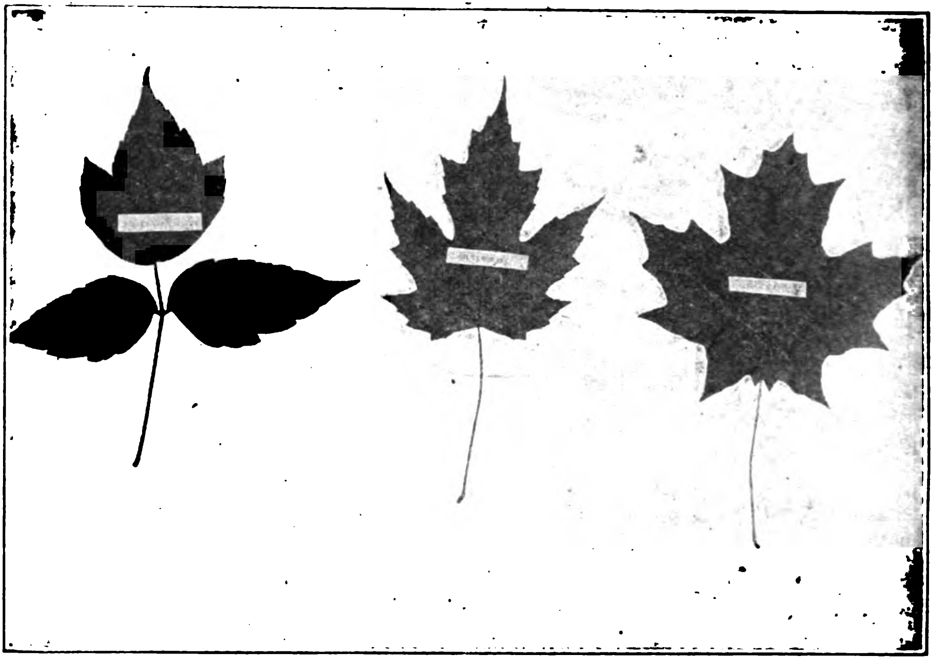
The sugar maple is fortunate in having a number of appropriate common names. The name sugar maple is appropriate for it produces annually large quantities of sweet sap. It is also called hard maple because its wood is hard in comparison with that of the other maples which are often grouped under the name Soft Maple. The name rock maple is also appropriate, because its wood is extremely hard.

The wood of Sugar Maple has a wide range of uses, and the farmer boy regards this tree as a real friend, for when tapped it produces large quantities of sap from which the delicious maple sugar and maple syrup are manufactured. This tree has yielded as high as 550,000 pounds of maple sugar and 275,000 gallons of maple syrup in a single season in Pennsylvania. This shows that the value of the tree lies not only in the fine wood that it produces but also in other products that it yields.

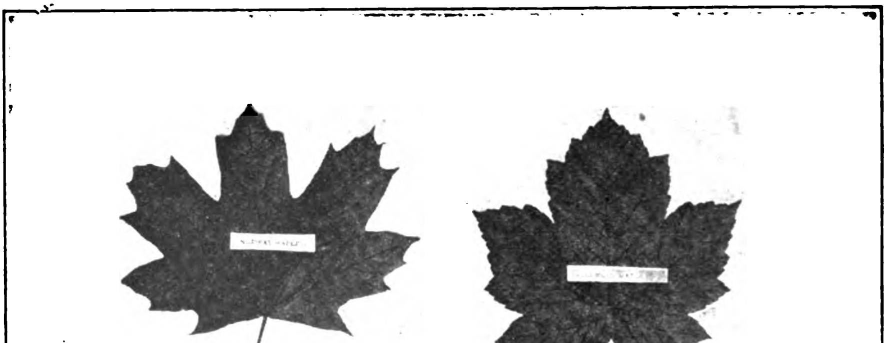
At all seasons of the year the sugar maple may be distinguished with little difficulty. The grayish to black bark on old trunks, roughened by shallow fissures, is always distinctive. The slender, brown twigs, marked with pale dots, are also positive means of identification. In summer its large, simple, and compound leaves, with coarsely-toothed lobes and delicate texture enable one to recognize it.

There is no more positive distinguishing characteristic of the sugar maple than its buds. They are brown in color, sharp-pointed, conical, and covered with 8 to 16 exposed scales. They are clustered at the ends of the twigs, and occur solitary and opposite each other along the side of the twigs. If seen but once, the twigs bearing these distinctive buds cannot be confused with those of any other native forest tree.

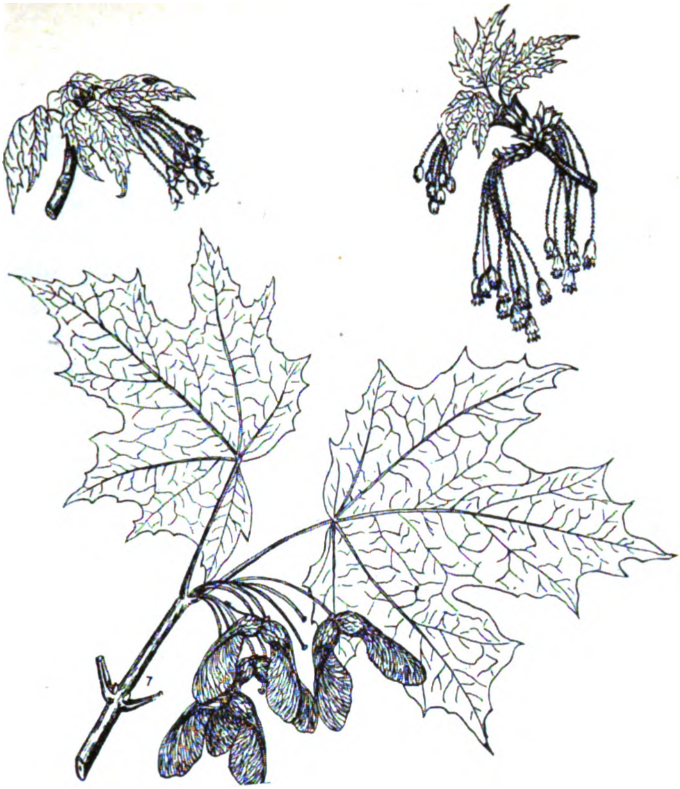
The fruit of the sugar maple does not mature until about September. It often persists far into winter, while that of the red maple and silver maple ripens in early summer. The seeds of the sugar maple germinate soon after falling to the ground, and the seedlings form a dense mat on the forest floor. The writer has counted as many as 50,000 small sugar maple seedlings on a single acre of



LEAVES OF THREE COMMON PENNSYLVANIA MAPLES.
Left to right: Ash-leaved maple, silver maple, sugar maple.

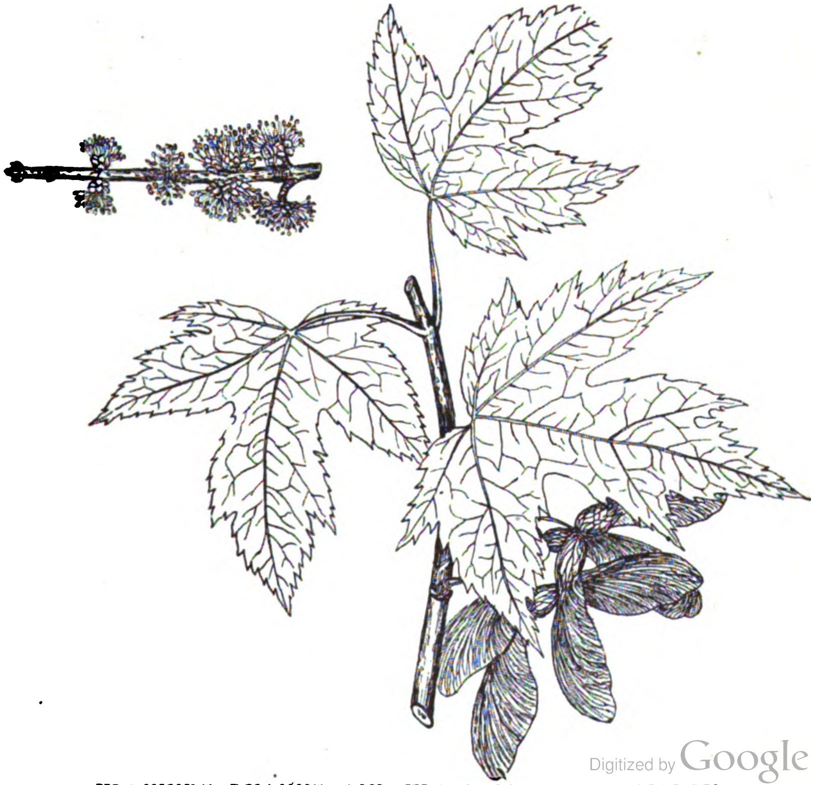


LEARN TO KNOW THE INTRODUCED MAPLES.
At the left is the leaf of theNorway maple, and at the right that of the sycamore maple.



SUGAR MAPLE, FLOWERS, FRUIT, AND LEAVES.

A DISTINCTIVE WINTER TWIG OF SUGAR MAPLE.



FLOWERS, LEAVES, AND FRUIT OF SILVER MAPLE.

forest land in northern Pennsylvania, and similar plots are common in New York, Michigan, and Wisconsin.

The wood of the sugar maple is well known and widely used. It touches our hands and satisfies our wants almost daily. We use it more frequently and in a greater number of ways than any other wood. It may be classified as an all-purpose wood, for it is used in the manufacture of at least 500 distinct articles of commerce. It makes the best wooden floor and is one of our chief furniture woods. Large quantities are used in the manufacture of broom handles, refrigerators, kitchen cabinets, toothpicks, children's toys, musical instruments, and agricultural implements. It is difficult to think of any common household article that is not, at one time or another, made from sugar maple wood.

The sugar maple tree is quite common in Pennsylvania. In fact, it is the commonest tree in the State. It is not equally common in all parts of the State, but is more abundant in the northern, northwestern, and northeastern parts of the State than in the southern and southeastern parts. It is a member of the northern hardwood forest, and becomes less common as one enters the southern hardwood forests which extend northward into Pennsylvania along the river valleys.

The sugar maple is one of our most dependable forest trees. It grows rather slowly, but it keeps growing steadily for a long while, and in time it attains a large size. One of the largest sugar maple trees known in Pennsylvania stands near Eagles Mere. It is a forest giant and towers high above all other surrounding trees. It is almost 4 feet in diameter, at breast high, and does not bear a single lateral branch for 60 feet from the ground. An occasional sugar maple reaches a height of 120 feet with a diameter of 5 feet, but specimens of this size are rare.

The sugar maple deserves to be protected and propagated for forestry and ornamental purposes. It produces wood which ranks among the best, yields delicious syrup and sugar, lives long, furnishes excellent shade, and possesses some of the cleanest and most beautiful features of any American forest tree. As a memorial tree the sugar maple has few equals, and as an avenue or roadside tree it ranks among the best.

RED MAPLE

The red maple never forgets its common or scientific name. At all seasons of the year some part of this tree is distinctly red. Early in spring red clusters of flowers appear all along the twigs, and red are the wings of its key-like fruit that matures during May and June. In summer there is a tinge of red on the leaf-stalks and veins of the leaves, and in autumn red maple may be found that stands out among its neighbors as a flaming torch. The scientific name of the red maple is **Acer rubrum.** This name is appropriate for the word "rubrum" means red. Other common names of this tree are soft maple, which refers to the softness of its wood, and swamp maple, a name given to this tree because it makes its best growth in swampy places.

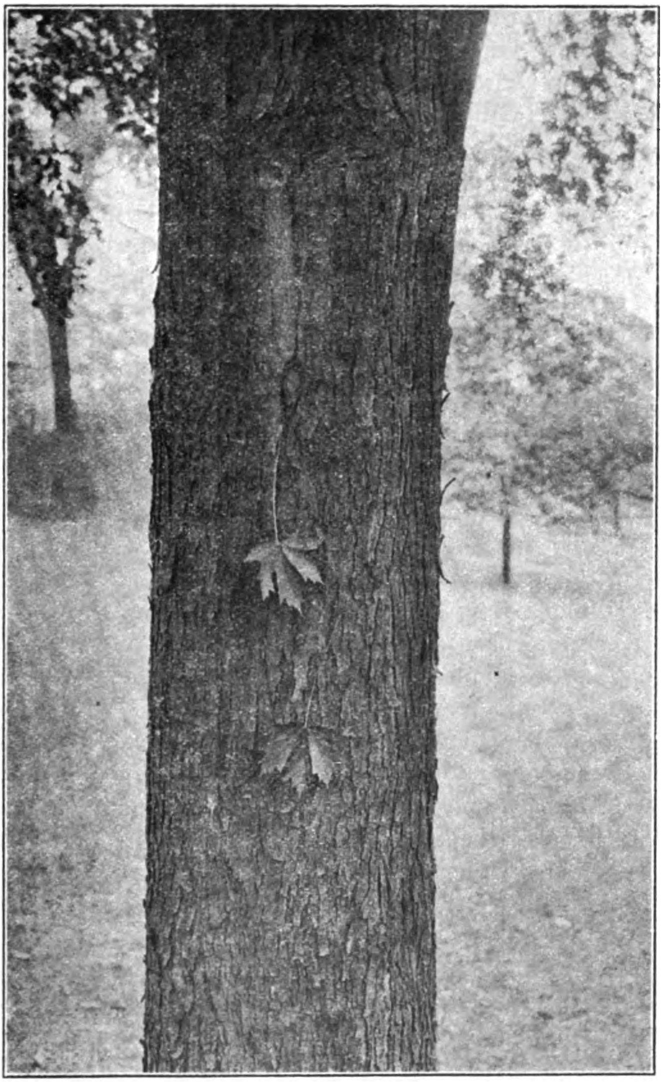
The range of the red maple covers more than 1,000,000 square miles, and touches every state east of the Mississippi River, and west of it, occurs from South Dakota to Texas. It is found locally throughout Pennsylvania. It is common to abundant in the regions traveresed by rivers and their main tributary streams. It prefers rather wet to swampy ground, but also makes a satisfactory growth on hillsides and often attains large dimensions in fertile farm woodlots in the agricultural valleys of the State. Big red maple trees sometimes exceed 100 feet in height and are more than four feet in diameter. Their average size is about seventy feet in height and two feet in diameter. The largest forest-grown red maple tree recorded in Pennsylvania stands in the woodlot of Jacob Meyers, near Coburn in Centre County. It is almost 4 feet in diameter and free from lateral branches for 50 feet from the ground.

The red maple can be recognized in summer by its simple, rather small, 3 to 5-lobed leaves, which are pale green to whitish on the lower surface, and darker green upon the upper surface. The clefts between the lobes of the leaves are shallow and sharp-pointed at the base. The latter characteristic distinguishes it from the closely-related silver maple which has clefts that are rounded at the base. In winter the red maple is bare of foliage, and displays its distinctive dark-gray bark; also its clean, smooth, grayish branches, and its bright red twigs, loaded rather heavily with clusters of winter buds and dotted with numerous white breathing pores known as lenticels. In winter it is rather difficult to distinguish the red maple from the silver maple. The latter, however, usually lacks the lustrous red twigs of the former and if one breaks the twigs of the silver maple they give off a rather pungent odor not found in the red maple.

The wood of red maple is about three-fourths as strong as that of the sugar maple, and is considerably lighter in weight. In color the wood is light brown, sometimes slightly tinged with red. The sapwood is rather thick, and lighter in color than the heartwood. Lumbermen know the difference between the red maple and our other native maples, but they do not consider it worth while to pile and sell the wood separately. It sometimes comes upon the market as hard maple, and at other times as soft maple, but never is it sold under the name of red maple. The wood is manufactured into flooring, veneer material, and interior finish. Large quantities of it are

A BIG RED MAPLE.

Many big maples are found in Pennsylvania. This one is 4 feet in diameter and clear of branches for 40 feet from the ground.



BARK OF SILVER MAPLE.

Scaly bark and shallow furrows are the main distinguishing characteristics of the silver maple bark.

also being used for pulpwood. It is also sawed into veneer which is made up into berry boxes and peach and potato baskets. Its sap is also collected and manufactured into sugar and syrup, but in smaller quantities than that of the sugar maple. In the days of the pioneer, ink and dyes were made from its bark, which also yielded small quantities of tannin.

There is a place in our forests for the red maple. It is tolerant of shade, grows rather rapidly, and becomes a big forest tree. It deserves a place in the understory of the forest, and, when an opportunity presents itself, it will grow up into the upperstory of the forest and produce valuable lumber.

If there is one maple that excels all other maples in beautiful coloration in the forest it must be the red maple. It also thrives when planted along streets and in parks, but it is rather short-lived and requires plenty of moisture.

SILVER MAPLE

The silver maple is one of the best known of the Pennsylvania maples, for it has a wide natural distribution and has been planted extensively as a shade and ornamental tree. It is a favorite with those who desire to secure shade with as little delay as possible, for it grows rapidly and is adapted to a great variety of soils, but does not flourish upon dry situations. It likes moist to wet places such as are found along river banks and borders of ponds.

The silver maple has a number of common names. Lumbermen usually call it soft maple because the wood is much softer than that of the sugar or hard maple. It is also known as white maple and silver-leaved maple, because the lower leaf surfaces are white or silvery white in color. Other common names are river maple, swamp maple, and water maple. These names refer to the habitat upon which this tree is usually found.

In summer the silver maple may be easily recognized by the silvery white under-surface of the leaves. The bases of the deep leaf-clefts of the silver maple are rounded, while those of the red maple are sharp-angled. The silver maple blossoms very early in spring before the leaves make their appearance. In fact, it is among the earliest of our native trees to bloom. In most localities the flowers appear before those of the red maple. They usually occur in compact, small clusters along the twigs, for each lateral bud usually contains from three to five blossoms ranging in color from reddish to crimson and are favorites with the honey bees which swarm around them on the first warm days of spring. Its fruit matures early in summer and is larger than that of any other of our native eastern maples. The bark is somewhat furrowed and separates into long scales which are often loose at both ends and attached at the middle. This is a helpful distinguishing characteristic at all seasons of the year. The bending down of the branches and the distinctive upward sweep of their small ends is also a helpful means of identification. In winter the silver maple can be distinguished from all other maples, excepting the red maple, by its numerous round, red, clustered buds; and from the red maple it may be distinguished by its bright chestnut-brown twigs which give forth a pungent odor if broken.

The silver maple occurs from New Brunswick and Ontario southward to Florida, and west to Oklahoma and the Dakotas. It is usually found along the banks of streams, borders of swamps, and other wet places. In Pennsylvania it is common along the banks of the principal rivers and their main tributaries. Along these streams it is commonest at the lower altitudes where it, together with the ash-leaved maple and the river birch, sometimes makes up 90 per cent of the trees along the river banks; but as one goes into the mountains and ascends to higher altitudes the tree becomes rarer and about the headwaters of the streams it is often entirely absent.

The silver maple may attain a large size upon favorable situations. It is not unusual to find a tree one hundred feet in height and from three to four feet in diameter. The wood is much softer than that of the sugar maple, but it is used for a wide range of purposes. It is especially prized in the manufacture of fruit baskets and berry boxes.

It is planted extensively for ornamental purposes, for it possesses attractive features. It is one of the first trees to bloom in spring, has an attractive clean bark, and produces beautiful leaves, and if grown in the open its outline and poise suggests an elm. A beautiful cut-leaf variety with a weeping habit has been developed and is being used rather extensively for formal planting. Before planting the silver maple for ornamental purposes, one should know that it is short-lived and its branches are so brittle that they are frequently broken off in winter by the wind and snow and ice pressure.

THE ASH-LEAVED MAPLE

The ash-leaved maple has ten or more common names. Among them are box elder, three-leaved maple, and water ash. There is no good reason why this tree should be called an elder or an ash, except that its leaves are compound. This characteristic is not sufficient reason for calling it a box elder or water ash, for it would be equally correct to call it a hickory or walnut, since these trees also bear compound leaves.

This tree is clearly a maple. Its fruit is a distinct maple-key and cannot be confused with the fruit of any other forest tree. Its compound leaves do not necessarily take it out of the maple group, for the leaves of some of our native maples are deeply lobed, and it is not a long step to the compound leaf with three leaflets.

The natural range of the ash-leaved maple does not fall far short of 3,000,000 square miles, and is equaled by few other forest trees. It is found from New England across Canada to Alberta, and thence south to Florida, Texas, and Mexico. It thrives in hot and cold climates, and grows well at high and low altitudes and in regions of much and little rain. The fact that it is such an adaptive tree accounts for its wide use in the early days by tree planters in the prairie regions. It was planted more extensively than any other tree by the homesteaders in the Middle West. Its rapid growth afforded early protection against the scorching summer sun and the strong winter winds. It was also among the first street trees in many of the western towns. The people planted it because they knew it would grow, and they were not so sure about some of the other trees. Now better trees have been found and they are willing to replace the ash-leaved maple by more valuable and better species.

The ash-leaved maple is most abundant in the eastern and southern part of Pennsylvania. It is quite common and attains a large size along the streams in the southwestern part of the State, and is the prevailing tree along the Conococheague Creek in Franklin County and other streams and rivers in southern Pennsylvania. As one follows these streams into the mountains, the Ash-leaved Maple becomes rarer and it is usually entirely absent at higher elevations in the northern and central part of Pennsylvania.

The ash-leaved maple differs from all other maples in that it has compound leaves with from three to five leaflets. The other maples of the eastern United States have simple leaves. It also differs from the other maples found within its range by the fact that it usually produces its pollen-bearing and fruit-producing flowers on separate trees, while both pollen-bearing and fruit-producing flowers of the other native maples usually occur on the same tree. This striking difference was formerly regarded sufficient reason to place the tree in a distinct group all by itself, but now it is again classed with the other maples under the technical name **Acer**.

Perhaps the most attractive feature of the ash-leaved maple is the rich color of its twigs. They are gorgeously olive-green and usually covered with a white bloom, and stand out boldly against the skyline. Its stout twigs may, in part, be responsible for the name of water ash. The large, ovate, and downy buds are also distinctive. They occur opposite each other and are usually arranged in small clusters along the twig. The leaf-scars completely encircle the twigs, and their edges meet in such a way as to form a sharp angle. The twigs and the buds are so distinctive that this tree can readily be recognized during the winter months from all associated forest trees.

The fruit of the ash-leaved maple resembles that of the other maples, but the maple-keys are arranged in drooping clusters and persist far into winter. It is not unusual to find the fruit clusters remaining upon the trees until spring. The seeds are scattered during four or five months of the year, and because of the large number that are produced the future of this tree is quite secure.

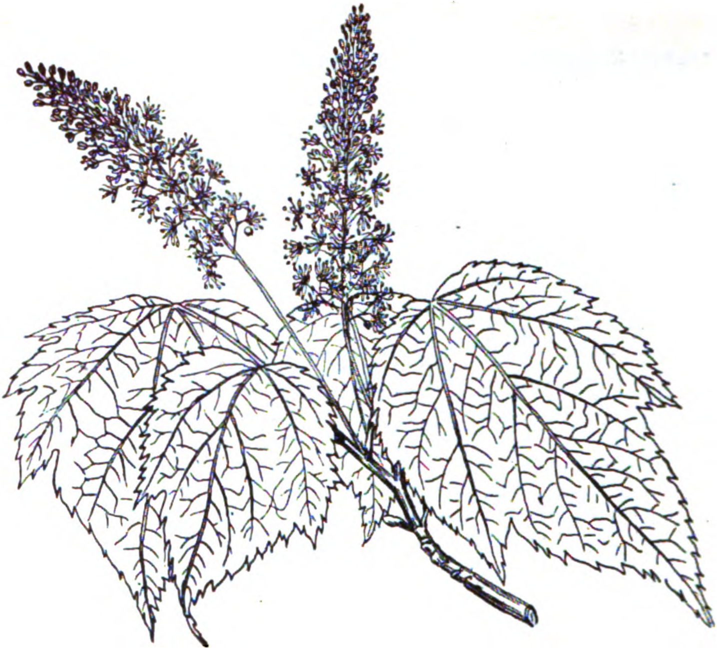
The bark on the older tree trunks is rather thick and distinctly furrowed, and it rarely breaks up into scales. The bark bears more resemblance to that of the ashes and basswoods than to other maples. This feature of the tree may be partly responsible for calling it water-ash.

The wood of ash-leaved maple is the lightest of the maples. It weighs less than 27 pounds to the cubic foot, and is manufactured into boxes, crates, flooring, woodenware, and locally into furniture. The tree reaches commercial size in at least thirty states, and in everyone of them it is cut and marketed. Recent tests show that wood pulp manufactured from it is satisfactory, and it is also used by distillation plants with the other maples, beech, and birch, and converted into charcoal and other products of distillation.

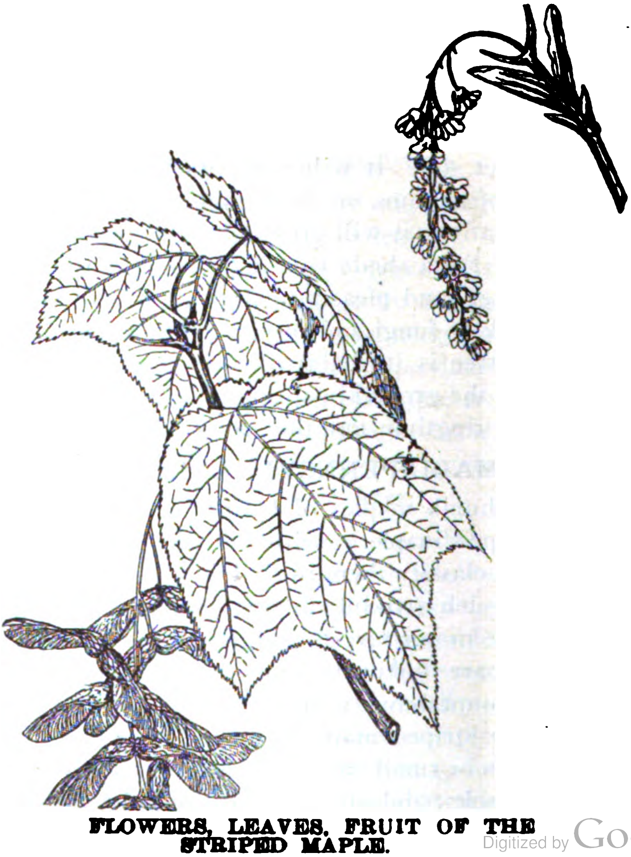
The ash-leaved maple deserves a place in our forests, and it may also be planted for ornamental purposes, but great care should be taken in selecting places upon which to plant it. It will grow well if set out in soil adapted to it, but one should remember that it prefers moist to wet soil. It will make its best growth if planted along the borders of streams or about ponds and lakes. If planted upon favorable situations it will grow fast and produce a dense and satisfactory shade. As a shade tree it has the advantages of rapid growth, dense foliage, and pleasing color. It is also comparatively free from the attack of fungi and insects. The chief objection to it as an ornamental tree is its habit of always shedding something. The blossoms litter the ground in spring, the seeds are dropped from early winter until springtime, and the leaves fall in and out of season.

TWO SMALL PENNSYLVANIA MAPLES

The two Tom Thumb maples of Pennsylvania are the mountain maple and the striped maple. Neither of these trees attain a size sufficiently large to classify them as timber trees, but both are so attractive and have such striking distinguishing characteristics that they deserve a place in our forests and in ornamental plantings. To those people who are fortunate enough to spend their summer vacations in the mountainous parts of the Northwoods, the mountain maple and the striped maple are familiar sights. Over large regions these shrubs or small trees are found along highways, by the margin of trout brooks, and about ponds and lakes. Both of them



ERECT FLOWER, SPIKES, AND LEAVES OF THE MOUNTAIN MAPLE.



FLOWERS, LEAVES, FRUIT OF THE STRIPED MAPLE.

are satisfied to take their place in the under-story of the forest, while others of their kin reach up high and struggle for a place in the upper-story of the forest. The following table gives the striking distinguishing characteristics of these two beautiful small maples:

	MOUNTAIN MAPLE.	STRIPED MAPLE.
FORM AND SIZE,	Shrub or small tree, rarely over 15 feet high; often occurs in clumps.	Small tree, usually 15-30 feet high.
LEAVES,	Usually 3-lobed, coarsely toothed, 3-5 inches long, light hairy on lower surface.	Goose-foot-like, 5-6 inches long, 3-lobed at apex, finely toothed, prominently veined; rusty hairs on lower surface.
FLOWERS,	Occur in erect spikes, 3 to 4 inches long.	Occur in drooping tassels 3 to 4 inches long.
FRUIT,	Small maple key about ½ inch long, arranged in dense drooping clusters.	Small maple key about ¾ of an inch long, arranged in open drooping clusters.
BARK,	On twigs reddish brown to gray; on stem reddish brown dotted with gray blotches.	On twigs reddish; on stem reddish brown streaked with long white lines.
HABITAT,	Prefers rocky situations on mountain tops and hillsides.	Prefers moist situations in dense woods.

THE MOUNTAIN MAPLE

The mountain maple has an appropriate common name, for it is a mountain tree. One usually finds it on moist rocky hillsides and along the border of ravines and highways. It seldom reaches a height greater than 20 or 25 feet. In the Northwoods it is usually small, often occurs in clumps, and occasionally it forms dense thickets. In the South it becomes larger and it is not unusual to find specimens that stand alone. In western North Carolina one can find trees with a breast-high diameter up to 12 inches.

The mountain maple is native from Newfoundland to Manitoba, south to Michigan and Pennsylvania, and extends along the Allegheny Mountains to Georgia. In Pennsylvania it is found locally in all parts of the State. It is rare in the eastern and western parts, and common in the mountains of central and northern Pennsylvania. The natives of Potter County call this tree "spotted maple" because of the gray dots that are spotted over the reddish brown bark.

The mountain maple can be distinguished by its simple 3 to 5-lobed and coarsely-toothed leaves. They are smaller, more evidently lobed, less conspicuously veined, and less hairy on the lower leaf surface than those of the striped maple. The new twigs of early summer are greenish and more or less downy, but after the leaves drop in autumn the small twigs have a rather distinct reddish brown to crimson color. If one examines the twigs closely there is seen upon them a whitish coating of fine hairs which enables one to distinguish the mountain maple from all other closely-related trees.

The flowers of the mountain maple do not appear until early summer—a short while after the leaves have reached full size. They are arranged in erect spikes at the end of the new growth. No other native maple has its white flowers arranged in such conspicuous erect spikes. The fruit matures slowly during the summer, ripens in autumn, and often remains upon the trees far into winter. During late summer and early fall the key-fruits often take on wonderful hues of red, and may furnish one of the most attractive features of the landscape. The individual fruit-keys are smaller than those of any other native maple and are clustered on slender drooping stalks.

The mountain maple is of practically no commercial importance as a timber tree, but it is valuable as a soil protector on rocky slopes, and very desirable for ornamental purposes. It seems strange that this tree is not more widely used in landscape gardening, for at all seasons of the year it possesses attractive features. It is very hardy. and apparently free from insect and fungous enemies. This tree has enough good points to justify a more extensive planting for ornamental purposes.

THE STRIPED MAPLE

The striped maple is one of the most distinctive members of the under-story of the forests of the Northwoods. Anyone who has wandered through the mountains of the North or the Alleghenies must have met this beautiful little tree. It is usually found beneath the big monarchs of the forest, and one cannot miss it for it is so beautiful and its white-streaked bark compels attention.

In summer the striped maple is easily recognized by the large goose-foot-like leaves which have a rather thin blade and are fashioned with a delicate network of veins. The upper surface of the leaves is dark green, while the lower surface is considerably lighter in color and clothed with short rusty brown to reddish hairs. The margins of the leaves are finely-toothed, and the leaf-blade is divided into three more or less conspicuous lobes. In spring and early summer, just when the leaves are about fully developed, the drooping clusters of beautiful yellow flowers dangle down from the twigs. The individual flowers are small, bell-shaped, and greenish to yellow in color. They cannot be confused with those of any other maple. The fruit is a typical small maple key with the wings united at a rather wide angle. It matures early in autumn, and there are about 15,000 seeds per pound.

The best way to distinguish the striped maple, also known as moosewood and whistlewood, is by its beautiful striped markings on the bark. The bark is generally some hue of green, or red, and streaked through it are conspicuous white lines. This characteristic is responsible for the name "streaked maple" which is used by the inhabitants of Potter and adjoining counties in Pennsylvania. In winter the large evidently-stalked buds covered with two smooth bud-scales, the smooth reddish-brown twigs, and the brown pith will enable anyone to distinguish this beautiful and distinctive small forest tree.

The striped maple has practically no commercial value as a forest tree, but its attractive features recommend it highly for ornamental purposes and as a member of the under-story of our natural forests it is worthy of our best care and protection.

TWO FOREIGN MAPLES

Two European maples have been planted widely for shade and ornamental purposes in Pennsylvania. They are the norway maple and the sycamore maple. It is difficult to find a town or city within the State in which one of these trees has not been planted, and in many places fifty or more per cent of all the street trees are Norway and sycamore maple. These two well-known and widely distributed foreign trees have a number of features in common, but they can be distinguished from each other at all seasons of the year by the characteristics set forth in the following table.

	NORWAY MAPLE.	SYCAMORE MAPLE.
BARK,	Black, furrowed, not scaly.	Brown, scaly, not furrowed.
LEAVES,	Flexible, large, coarsely-toothed, almost entire on margin, smooth on lower surface, resembles Sugar Maple; leaf-stalks contain milky sap.	Firm, 3 to 5-lobed, sharply-toothed on margin, slightly hairy on lower surface; leaf stalks do not contain milky sap.
FLOWERS,	Arranged in yellowish green clusters.	Arranged in erect spikes about 3 inches long.
FRUIT,	Large maple-key with widely divergent wings.	Small maple-key with almost parallel wings.
BUDS,	Large and red.	Large and green.

NORWAY MAPLE

The norway maple comes to us from Europe, where it is found from Norway to Switzerland. In its native home it reaches a height of 100 feet and a diameter of 3 feet. It is occasionally used for forest purposes, but its main value is as a street, shade, and ornamental tree.

The norway maple can readily be distinguished in summer by its large leaves, which resemble those of the sugar maple, but they are deeper green in color and firmer in texture. Its large-toothed and almost entire-margined leaves are readily distinguished from the 3 to 5-lobed and smaller leaves of the sycamore maple. A charactristic by which the norway maple can always be identified is the presence of milky sap in the leaf-stalks, for no other maple of Pennsylvania has this rare characteristic. The milky sap flows freely if the leaf-stalks are twisted or pressed. Another feature by which this tree may be recognized in spring and early summer is its yellowish green flowers. They are produced in large numbers and arranged in dense clusters along the twigs. They come out of the same buds as do the leaves, and blossom when the leaves are from one-third to one-half developed.

In winter this tree can be recognized by its large red, blunt-pointed and glossy buds. They are usually bright red but may be more or less olive green at the base especially in autumn before they are mature. The lateral buds stand close to the twigs while those of the sycamore maple project outward. The fruit of the norway maple does not ripen fully until late in summer or early autumn. They are larger and more beautiful and distinctive in form than those of any of our native maples. These key-fruits have wide divergent wings, which enables one to distinguish this tree from all other maples. Many of the key-fruits remain upon the tree after the leaves have fallen. Sometimes they hang upon the trees all winter, and because of their large size and distinctive form are helpful in recognizing this tree during winter months.

The norway maple is one of the most attractive of our ornamental trees and is unquestionably the best maple that we have for street use. It is especially adapted for city planting because it is tolerant of unfavorable city conditions. It is also hardy, rather free from the attacks of insects and fungi, and retains its leaves longer in fall than our native maples.

SYCAMORE MAPLE

The sycamore maple, like the norway maple, is a European tree, It takes its name from the fact that its leaves are supposed to resemble those of a sycamore. In central Europe it attains a height of 120 feet, and develops a large spreading crown. The trunk is sometimes furrowed, and the bark flakes off in thin scales. In its habit of growth it follows the norway maple, except that its top is not so compact, and it is also less tolerant of soil conditions and consequently is not planted so extensively as its European brother.

The sycamore maple is readily distinguished by its firm 3 to 5-lobed leaves with sharp-toothed margins. The clefts in the leaves are sharp-angled, and the lower leaf-surface is usually somewhat hairy. In winter the large blunt-pointed green buds, the bud-scales of which usually have a black margin, are a sure means of identification. Its leaf-scars do not quite encircle the twigs, while those of the norway maple reach completely around the twigs. The little dots on the twigs known as lenticels are more numerous on the sycamore maple than on the norway maple. The lateral buds of the sycamore maple stand out from the twigs, while those of the norway maple hug the twigs closely. The fruit-keys of the sycamore maple are smaller and thin wings less divergent than those of the norway maple. These characteristics enable one to distinguish the two widely introduced European maples at all seasons of the year.

The sycamore maple is not so hardy as the norway maple, nor is there anything distinctive about the tree to make it preferable to our native hard maple. It is often attacked by borers and does not thrive on all kinds of soil. There exists no good reason for planting this foreign maple on an extensive scale in Pennsylvania.

WHERE TO STUDY TREES

The place to study our trees is not so important as the time to begin getting acquainted with them. The thing to do is to start studying them to-day, and not wait until to-morrow or next week. If you live in a city and it is not convenient or possible to go out in the woods, you may study the trees along the streets or in the parks. The small woodlots, fence rows, stream banks, and abandoned fields are much better places. But, the best place for a real study of our native trees is the remote wildwoods, that is, the extensive and natural forests on our mountain slopes, hilltops, and valleys.

In the woods of Pennsylvania there are more than 100 different kinds of native trees, and when one observes them in the remote mountain regions they look so natural and fresh. Associated with them are many other plants and a large number of animals. If you are really anxious to learn to know the trees and can possibly do so, take a hike to the wildwoods and there observe the wonders of nature and study the works and ways of the wild folks.

No woods within the State are better equipped for tree study than the State Forests. In 1897, the State of Pennsylvania, through its Department of Forestry, began buying land for forestry purposes. To date (January 1, 1922) 1,126,237 acres have been purchased at an average cost of $2.26 per acre. This large area is now being developed so that it will yield not only wood, but be of the greatest service to the inhabitants and visitors of the State.

In order to handle the state-owned land properly, the aggregate area has been divided into State Forests, each one of which is in charge of a technically trained Forester, who aims to manage the land in his care in the best interests of the public.

An increasing number of people are annually seeking the advantages and benefits of a few weeks of real out-of-door life on the State Forests. The Foresters will help you select a suitable camp site, tell you about the streams, springs, roads, trails, and look-out towers, and even help teach the boys and girls about the trees, shrubs, herbs, and other plants and animals of the forest.

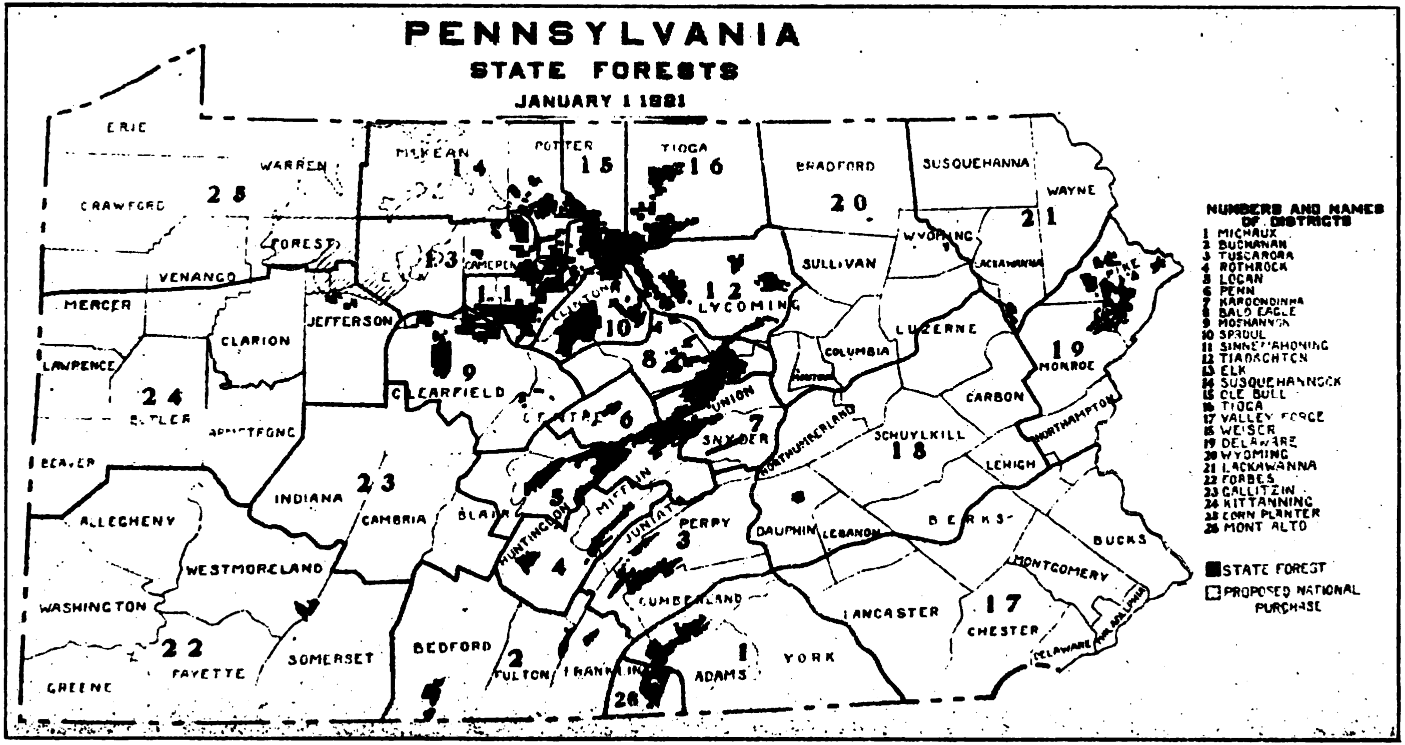
WHERE THE STATE FORESTS ARE LOCATED

Most of the State Forests of Pennsylvania are located in the mountainous part of the State. They are wide open for use and contain some of the best playgrounds and rest places. If you are planning a trip to the mountains, a week in the woods, or some other out-of-door doings, it may save you much money and eliminate a lot of worry if you look over the following table, which tells you where the forest land now (January 1, 1922) owned by the State of Pennsylvania is located:

	COUNTY	ACRES
1.	Adams,	20,887
2.	Bedford,	10,756
3.	Cameron,	83,055
4.	Centre,	79,388
5.	Clearfield,	64,875
6.	Clinton,	143,829
7.	Cumberland,	21,720
8.	Dauphin,	3,808
9.	Elk,	22,767
10.	Franklin,	34,677
11.	Fulton,	6,355
12.	Huntingdon,	62,249
13.	Jefferson,	5,681
14.	Juniata,	3,534
15.	Lackawanna,	5,275
16.	Lycoming,	104,306
17.	Mifflin,	50,383
18.	Monroe,	6,400
19.	Perry,	29,468
20.	Pike,	58,109
21.	Potter,	158,785
22.	Snyder,	19,087
23.	Somerset,	3,467
24.	Tioga,	66,941
25.	Union,	54,193
26.	Westmoreland,	5,065
27.	Wyoming,	1,177
	Total,	1,126,237

YOU ARE WELCOME ON THE STATE FOREST

The people of Pennsylvania own over one million acres of forest land which is being administered for them by the Department of Forestry. Every acre of this vast area, which comprises some of the



WHERE THE 1,126,237 ACRES OF STATE FORESTS ARE LOCATED.

most attractive camp site, finest fishing streams, and best hunting ground within the State, is open for public use.

You do not need a pass to go on the State Forests and to enjoy yourself. They are neither surrounded with high stone walls or barbed wire fences, nor with signboards bearing the words "No Trespassing", "Closed", or "No Admittance". Instead each forest is wide open for business and for play.

All that will be required of you is to obey a few simple rules which all good citizens of the State are always willing to do. There is no red tape to this proposition of public use of State Forest land. It is a whole-hearted plan which aims to be of the greatest service and utmost benefit to all the people of the State.

Remember that you are always welcome on the State Forests of Pennsylvania. The Foresters in charge of them will be delighted to show you over the woodland areas in their care. They will do more than merely greet you, for one of their duties is to help you locate a suitable camp site and tell you how to get a camping permit. They will explain to you the rules and regulations of the forest and direct you to fine fishing streams. They will also point out good roads, attractive trails, beautiful vistas, wonderful look-outs, and in addition tell you many interesting things about forestry.

FACTS ABOUT PENNSYLVANIA STATE FORESTS

The original forests covered practically every acre of ground in Pennsylvania. More than thirteen million acres are still classified as forest land, but about five million are barren and unproductive. This is the Pennsylvania Desert.

The Department of Forestry began purchasing forest land in 1898 The total area of forest land owned by the State (January 1, 1922) was 1,126,237 acres. The average price paid per acre was $2.26.

Forestry is a business enterprise. A concise financial statement pertaining to the State Forests follows:

Total purchase price	$2,546,407.71
Total amount expended for administration, development and improvement	5,182,262.68
Total investment and expenditures	7,728,670.39
Amount deposited in State school fund	241,793.64
Net expenditure	7,486,876.75
Estimated present value of forests	$12,255,439.51
Net expenditures	7,486,876.75
Net gain on investment	$4,768,562.76

The Department of Forestry has paid for road, school and county taxes $616,040.17 to the counties in which the State Forests are located.

There are 60 Foresters and 82 Forest Rangers in the employe of the Department of Forestry.

There are 2,628 local and special Forest Fire Wardens in the State who watch for and fight forest fires.

There are 422 State-owned buildings on the State Forests valued at $306,329.39.

Approximately 2,000 miles of forest boundaries have been surveyed, cleared, and marked.

More than 4,000 miles of roads, trails, and fire lines have been constructed and are being maintained.

During 1921, 400 temporary camping permits were issued to 5,000 persons.

More than 750 leases for permanent camp sites have been issued.

Seventy steel fire look-out towers have been erected by the Department of Forestry for the purpose of detecting forest fires, and four steel towers were erected by the Anthracite Forest Protective Association.

Three forest tree nurseries are maintained by the Department of Forestry, which are producing from five to eight million trees each year.

A total of 34,222,596 trees have been planted on State Forests. The plantations now cover 22,468 acres.

During the last twelve years private planters have received from the Department of Forestry 14,627,006 trees, which were set out in all parts of the State.

Within the State Forests are many of the best places to rest, finest fishing streams, best hunting grounds, and grandest views within the State.

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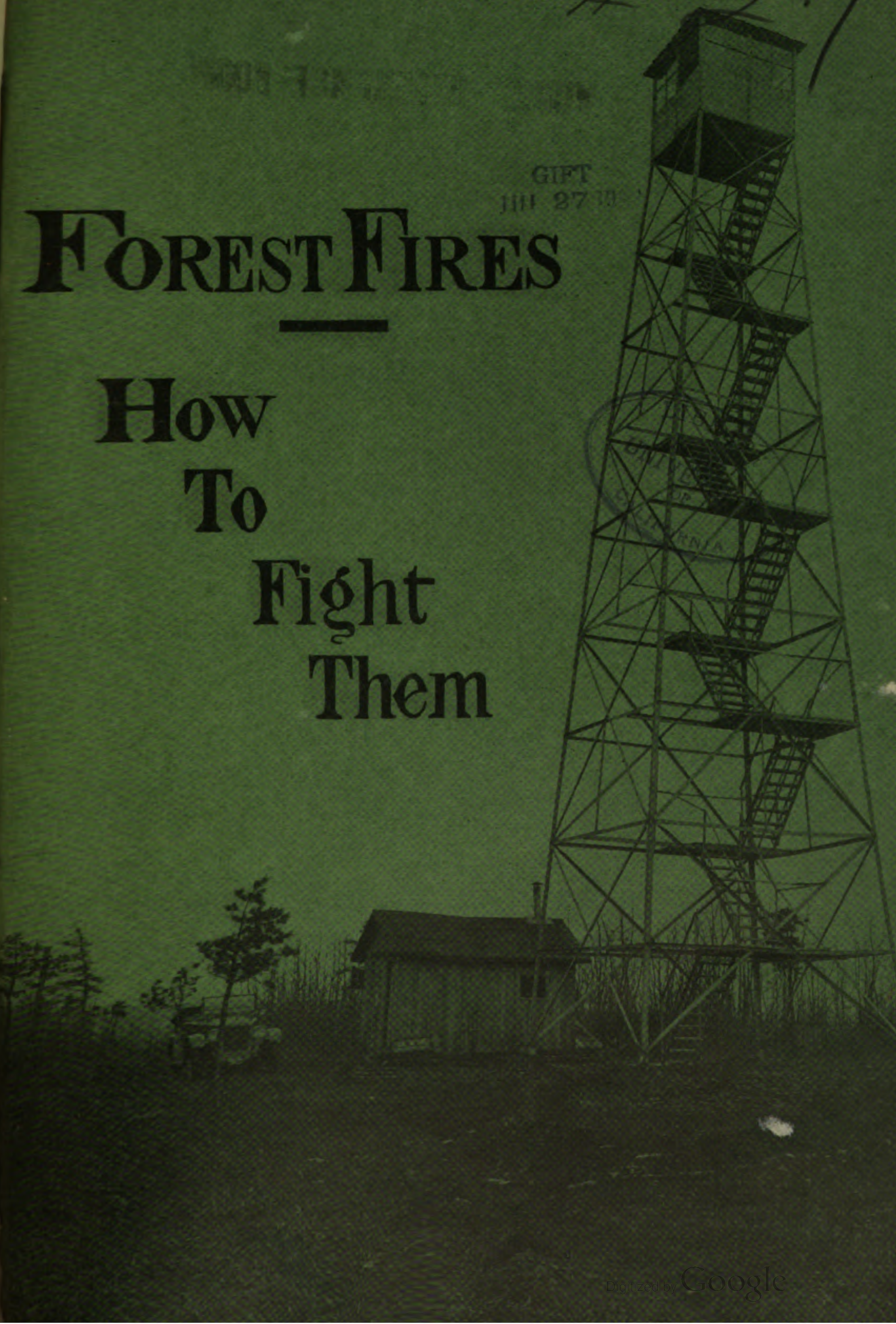
FOREST FIRES

How To Fight Them



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF FORESTRY

FOREST PROTECTION
FIRE PREVENTION AND EXTINCTION

BULLETIN 27

R. Y. STUART, COMMISSIONER

1922

PREVENT FOREST FIRES — IT PAYS

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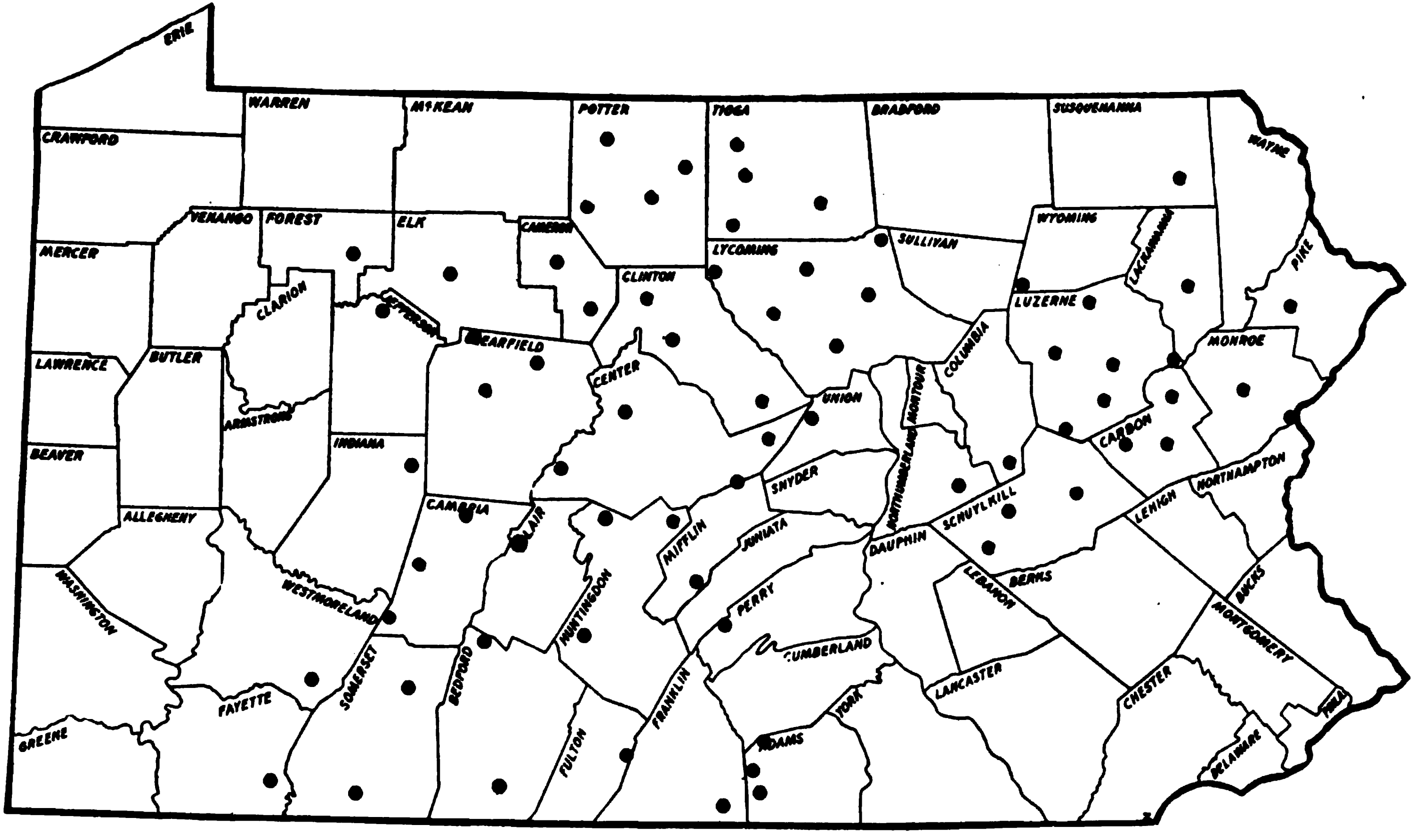


FIRE OBSERVATION TOWER SYSTEM IN PENNSYLVANIA

FOREWORD

THE FOREST IS YOUR FRIEND.

THE WATER YOU DRINK COMES FROM IT.

NOTHING YOU USE OR WEAR COULD BE YOURS WITHOUT THE FOREST'S HELP.

THE STATE FORESTS ARE YOUR PLAYGROUNDS. THEY ARE WIDE OPEN FOR YOU TO FISH, HUNT AND CAMP.

OUR FORESTS ARE ALMOST GONE.

THEY WILL GROW AGAIN IF FIRES ARE KEPT OUT.

THE FOREST FIRE IS YOUR ENEMY.

GIFFORD PINCHOT.

INTRODUCTION

This guide has been prepared for Pennsylvania Boys. Because many of them have given valuable assistance in forest protection, the Department of Forestry believes they are anxious to do effective work in forest fire extinction. This booklet is intended, therefore, to tell some of the interesting facts about forest fire, how it burns, how it may be prevented, and how it may be put out.

FORESTS NECESSARY IN PENNSYLVANIA.

Forest fires must be prevented because the future prosperity of Pennsylvania depends upon her supply of wood. We cannot get along without it—nothing we eat, nothing we wear can be supplied without wood. We cannot have this wood supply as long as fire endangers every acre of growing trees, and burns about 200,000 acres of forest land every year. We must provide for our future needs, therefore forest fires must be prevented.

HOW FOREST FIRES START.

Much might be written about how fires start and why they start. The kinds of fire may be grouped under two headings— (1) Non-preventable; (2) Preventable.

CLASSIFICATION OF FIRES:

1. Non-preventable.

Instances: Lightning and spontaneous combustion.

2. Preventable.

(a) Incendiary—Fires set maliciously. (Back-firing in good faith does not fall within this class.)

Instances: Burning of another's woodland for one's own advantage.

(b) Railroads—Fires caused during the construction, operation, or maintenance of railroads, except those used in lumber operations. These fires are of two classes: From engines, or from the right-of-way.

(c) Lumbering—Fires caused by lumber operations.

(d) Burning Brush and Litter—Fires caused while clearing land except those mentioned above.

(e) Transients—Fires resulting from the carelessness of campers, picnickers, surveyors, laborers (except railroad and lumber operations), hunters, automobilists and other travellers or workers in the forest.

(f) Miscellaneous—Fires, the origin of which is known, but which cannot be classified properly under any of the heads mentioned above.

Instances: Tractors, fireworks, breaking of electric transmission lines, etc.

(g) Unknown—Fires, the origin of which cannot be fixed so as to include them under any other head.

NUMBER OF FOREST FIRES BY CAUSES.

Year.	Railroads	Brush Burning	Incendiary	Transients	Lumbering	Lightning	Misc.	Unknown	Total
1915	274	105	120	136	28	19	37	382	1,101
1916	270	55	95	182	44	10	45	312	1,013
1917	756	173	127	200	45	3	52	731	2,087
1918	492	115	118	99	46	6	162	587	1,625
1919	250	77	76	118	28	3	20	378	950
1920	553	104	128	218	44	4	25	521	1,597
1921	979	129	96	121	13	10	119	917	2,384

This table of causes of forest fires in Pennsylvania shows:

1. That very few fires are caused by lightning.
2. That carelessness or neglect by someone causes more than ninety-nine per cent of the forest fires. No matter what the immediate or apparent cause may be, the real cause can be traced in most cases to carelessness or neglect.

   Sparks from railroad and other engines cause the greatest number of fires. The engines have not been properly equipped with spark arrestors and closed ash pans or have been carelessly operated; safety strips have not been provided or track patrolmen have not put out the sparks.

   Smokers are probably responsible for the next largest class of fires. They are careless with matches and burning tobacco.

   Campers are careless or negligent with their camp fires, either in building them or in leaving without putting them out.

   Those who burn brush do not take precautions to keep their fires constantly under control.
3. That some fires are set purposely.

PREVENT FOREST FIRES.

Pennsylvania will continue to have forest fires, until every person knows the value of forests and realizes the great damage caused by carelessness with fire. The first thing necessary, therefore, in order to save the forests is to have every one learn how forests benefit them and how impossible it is to live without forests and forest products.

Persons who smoke while walking or riding through the forest should not drop fire upon the dry leaves or grass. They must take no chances with matches, cigars, cigarettes, or pipe.

Those who build fires in the forest should first clear a big space; should keep the fire small; should not build it against a log or hollow tree; and should be sure to put out every spark before leaving.

Persons should burn brush, while clearing fields, woods, or fence rows only when the woods are damp, and then only with sufficient help and under advice of a forest fire warden.

Those who operate wood or coal-burning engines in or near forests must insist upon equipment which will not permit sparks to escape.

Persons who persist in their carelessness or who purposely set fire to the forests should be punished. In order to do this local officials and neighbors should be interested so they will help prosecute the case.

REMOVE FOREST FIRE HAZARDS.

Some fires are started because of an unnecessary accumulation of inflammable material at places where the use of fire cannot be prevented. The size of forest fires may be greatly increased because of these accumulations. The removal of this material from roadsides, railroads, sawmills, and engines is important.

The Chief Forest Fire Warden of the Pennsylvania Department of Forestry has issued the following statement concerning hazards that must be removed:

"Under the provisions of the Act of June 3, 1915, it is my duty as Chief Forest Fire Warden to declare a public nuisance any property which, by reason of its condition or operation, is a special forest fire hazard, and, as such, endangers other property or human life. In Section 1004 the Act further provides that every person or corporation refusing to comply with an order of the Chief Forest Fire Warden for the abatement of a nuisance, under this act, shall be guilty of a misdemeanor, and upon conviction thereof shall be sentenced to pay a fine of not more than One Hundred Dollars, or undergo imprisonment not exceeding one month, or both, in the discretion of the court * * * and every day's continuance * * * shall be a separate and distinct offense.

"1. Engines of all kinds not provided with effective spark arresters, ash pans, or other equipment to prevent the spread of fire when such engines operate within 200 feet of woodland or of other inflammable property likely to spread fire to woodland.

"2. Inflammable debris within 100 feet of a steam railroad track. This includes uncleaned woodland which requires cleaning for the completion of a safety-strip along the railroad.

"3. Inflammable debris located within a radius of 150 feet from a sawmill or other engine operating within woodland or operating within 150 feet of woodland.

"4. Inflammable debris within 25 feet of the edge of the traveled part of a public highway, the clean road bed of an electric railway, or of any other frequented highway.

"5. Slash from lumbering operations without a protective strip of 100 feet adjoining woodland.

"As used above, debris means such material as slash, mowings, or other wastage, and accumulated forest litter.

"It should be understood that in unusual or extraordinary cases the Department is not restricted to action based upon the conditions cited above. Its duty is to invesigate independently, or upon report, all forest fire hazards and to base its action upon the conditions in each particular case.

"When hazards within the provisions of the Act are found, notice will be given to the responsible parties that they must be removed. If after notice duly given they are not removed, it is my purpose to declare them public nuisances and to recommend that action be taken under Section 1004 of the Act."

SAFETY-STRIPS: Along railroads, safety-strips from 100 to 200 feet from the rails may be lightly burned. At the outer edge of this strip a trail of bare soil may be dug or plowed. Several fresh furrows should parallel the railroad in the spring and fall along grass and waste fields. Owners of land along railroads should be urged to take some precautions against fire, and not depend entirely upon the railroad company.

Burning should be started at the bare soil strip and proceed toward the track. Extreme care is necessary to prevent the fire getting beyond control and doing damage instead of good.

All slash, brush, and rubbish that will burn, or in which fires may start, within 150 feet of a railroad track ought to be disposed of by burning or be otherwise removed. Similarly such material should be removed from a twenty-five foot strip along traveled highways and electric railways. If such material is not allowed to accumulate careless travelers will not cause so many fires.

Around sawmill and other engines which are operated in or near forests all inflammable refuse should be removed within a circle having a radius of at least 150 feet, with the engine as the centre.

In the woods, when the trees are cut, everything in the tree that can be used should be taken out, leaving only the small branches.

These may be burned in piles or scattered over the ground where they will soon decay. All dead trees, standing or down, should be used if possible. Decaying trees, crooked trees, and trees which are of little present or future value should be cut before the sound and valuable trees are cut. Keeping the forest free from such rubbish helps to prevent the start and the spread of forest fires.

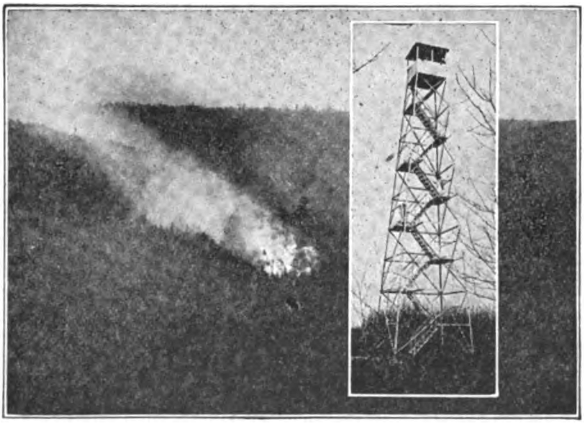
By keeping roads and trails through woodlands open and at least a foot of their surface bare to the mineral soil, fires may be attacked promptly and kept within a small area.

FIRE EXTINCTION: Next to preventing fires, it is important to extinguish at once all fires that may start.

The fire, when discovered, should be reported immediately, and should be attacked promptly by persons who know how to fight it. The fire fighters should be organized, but one person can do much by hitting the line of fire wherever possible and sticking to it.

PRESENT FOREST FIRE ORGANIZATION.

WARDENS: The State of Pennsylvania has an organization of forest fire wardens who prevent and extinguish forest fires. The State's Chief Forest Fire Warden is in the Department of Forestry at Harrisburg. He directs the fire prevention work of the Foresters in charge of the twenty-four districts into which the State is divided. The District Foresters supervise the activities of more than 2,800 local and special forest fire wardens.



TOWERS: There are 111 observation stations in the forested areas of the State. During fire seasons watchmen, or lookouts, are on these towers. Towers are connected with telephone lines, so that fire fighting crews may be summoned promptly. There are also a number of men appointed to do patrol duty in dangerous seasons. The special duty of towermen and patrolmen is to discover and report the locations of fires.

This organization is constantly on the alert to detect, to report and put out forest fires. The effectiveness of the organization depends upon the cooperation of the citizens with the wardens. These citizens report forest fires to the nearest wardens who will go promptly to extinguish them. This may be done by telephone, telegraph, messenger, bell, whistle, or by other methods.

In addition to the Foresters, Forest Rangers, and Forest Fire Wardens of the Department of Forestry there are other persons who are cooperating in forest fire prevention:

State Game Wardens are also forest fire wardens.
State Policemen are forest fire wardens.
State Highway employes furnish men, tools, and trucks, for fire extinction.
Rural mail carriers are designated forest fire patrolmen by the United States Postmaster General, with instructions to report fires promptly to the nearest local forest fire warden.
Telephone companies in Pennsylvania instruct their operators to refer forest fire calls directly to a forest fire warden.
Railroad companies have had section foremen who are located near woodlands made special forest fire wardens.
Individuals and corporations have had regular employes appointed special wardens.
Individuals and organizations, particularly the Forest Protective Associations, Boy Scouts, Fish and Game Associations, Chambers of Commerce, etc., cooperate with the Department of Forestry.

FIRE CREW: Usually wardens need help to put out forest fires. It is important that those who help know where to go and what to do. A few people well-organized into a crew and working in cooperation are of much more value at a fire than a large number disorganized and without method in their work.

A good crew is made up of a foreman, who should be a forest fire warden, or some one designated by him. There should be one or two axemen according to location of the fire to remove brush or logs from line of attack; three or four men with rakes to clean a trail, exposing mineral soil, from which to start a back-fire, or up to which the fire may burn and stop; a torchman to start a back-fire; three or four guards to watch the back-fire and see that it does not throw sparks across the trail, and one man or boy to carry water.

The crew members should respond promptly and assemble at a prearranged place. Each man should have the same work to do every time he goes on the fire-line.

FIGHTING FOREST FIRES.

PROMPT ACTION: The efficiency of a warden and his local organization is determined by the time which elapses between the start of the fire and the first attack. There should be no excuse for delay after a fire is known to exist. Quick action reduces expense, loss, hard work, and prevents big fires. Small fires are easily subdued. It is true that fire fighting is more effective in the evening, night, or early morning, but it is a criminal waste to wait until that time to begin.

TRANSPORTATION PREARRANGED: The warden should have arrangements made in advance of the fire season for transportation of fire fighters. It is not difficult to arrange with automobile owners and drivers to furnish cars on short notice for this kind of service. But the plans must not be delayed until a fire starts.

CALL OF CREW: If a fire-fighting crew is well organized its members can be brought together in a short time when a prearranged signal is sounded. This signal may be a local alarm, bell or whistle. It should be understood where the crew is to meet. Additional help, if needed, should be summoned by telephone. In some towns, arrangements have been made to sound forest fire alarms on the usual municipal fire bell or whistle. A distinctive forest fire alarm has been agreed upon so there will be no confusion.

Ordinarily, it is not wise to call out more than two or three crews at the first call, unless the fire already has a good start, or that it is likely to become dangerous in a very short time. On the other hand, it is always well to remember that it is better to have one or two crews too many than to be one crew short. If, after reaching the fire it is found that more men will be needed, no time should be lost in sending for additional forces. If necessary, nearby fire wardens should be notified by telephone or telegraph.

ORGANIZED WORK: At a fire, the forest fire warden is in charge. He must keep the crew under his control at all times. Those who go to a fire should report to a warden. If the warden is absent, a foreman should be selected. The proper control of a crew requires skill and judgment. Too many bosses in a fire-fighting crew slow up the attack. Determine upon a method of attack, and follow it fast and hard. If more than eight or ten men are present, the force may be divided, with a foreman in charge of each crew. Each crew should be stationed at some important place on the fire line. In this way the fire may be more effectively controlled. By putting each man to the work he can do best, the whole force will be used to best advantage. For example, at a light surface fire one crew may be sent along the fire line with extinguishers or sprayers followed by men with rakes, shovels, hoes or brooms to clear the ground of litter and prevent the fire from crossing the line. Another crew may be sent for water to keep the spray tank supplied. Or in case of a fire sweeping through brush and timber, if back-firing is resorted to, the foreman should go ahead and decide on the line from which the back-firing is to be done; one or two axemen should follow, then several men with forked sticks, rakes, brooms, hoes, shovels, mattocks, etc., should clear the trail down to bare earth. One torchman, to set the back-fire, is usually sufficient. He should be followed by guards, who are sometimes equipped with sprayers or chemical extinguishers, to prevent fire crossing the trail. The rear guard must be the most reliable man of the crew for he must see that the fire line is safe before he moves up the line.

CARE OF CREW: Forest fire fighters need water, food, and rest. Everyone going to fight a forest fire should take a lunch along. The other actual needs of the men should be supplied as far as possible. If any men are allowed to go home for food or supplies they may not return promptly. The crew should work in shifts if necessary.

LOCATION OF FIRE. It is important to know where the fire is before starting out. Some one, usually the warden, should telephone promptly to persons who can see the fire or smoke from it. The location of the fire can best be obtained from the watchman on the nearest fire observation tower. False alarms are sometimes sounded, but it is better to respond to a false alarm than to let a fire get well started.

ATTACK: Upon arrival at the fire, the person in charge should find out two things as soon as possible: (1) which part of the fire is advancing most rapidly; (2) the location of forest growth or other valuable property which is likely to be destroyed. No two fires are alike, even though they may occur under similar conditions, and in deciding the method of attack the warden, or crew leader, is required to apply his knowledge of conditions and his skill in handling his men. The two things for which he must work, therefore, are limitation of the area burned-over, and control of the damage to timber. He must decide quickly whether to place his men between the fire and the valuable forest growth or in front of the rapidly-spreading flames. In the majority of cases the latter is the logical course. The warden should judge the speed of the fire and decide how far ahead of it he will start his attack. He should know the distance to the nearest fire-break, such as a trail, road, brook, field, etc.

It is assumed the warden will be prompt, and that he and his crew will arrive while the fire is small. But if for any reason a warden must attack a large fire he should take the men to the front, start the attack at a favorable place, and then size up conditions, going entirely around the fire if necessary. No time must be lost, but a half-hour spent in making good plans after a complete investigation, may determine the success or failure of the fight.

"For instance, to beat out a hot fire line in the woods within a short distance of a road in a dry time is generally mistaken judgment, since the fire is exceedingly likely to break over again as it would not with the bare soil of the road to help control it; or spreading a limited force of fighters on a long fire line, part of which is headed toward a natural barrier, and part of which is not, weakens the work where most needed and spends effort where unnecessary.

"Fire can be headed or directed into natural barriers like swamps, clearings, old burns, hedges, etc., by choosing which portion of the head fire to attack first, when the whole fire line cannot be met promptly and effectively because of its magnitude or of lack of help. Judgment used in this way is worth more than hours of labor."—New Jersey Circular.

METHODS OF FIGHTING.

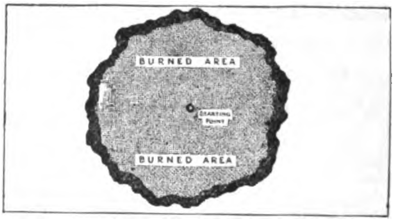
There are many methods of fighting forest fires. Some are good and some are not. Some men think their method is the only correct one. A good warden is always ready for useful suggestions, and is willing to give them fair trial. Methods of fighting vary with the character of the fire, type of the forest, condition of the atmosphere, strength and direction of the wind, rapidity of the fire's advance, topography, and material on the ground.

TREE FIRES: These are stopped by shutting off the air which makes a draft through the hollow trunk. Close the hole at the ground if possible with dirt. If this cannot be done, the ground around the burning tree should be cleared, and the tree should be felled. The fire can then be smothered inside and outside. If water is available, the fire may be put out with force pump or sprayer or chemical extinguisher without felling the tree. Dead snags in forests should be felled as a matter of fire prevention as well as for the benefit of the forest.

SOIL FIRES: These fires can be stopped only by digging deep enough to prevent their spread. The ditch, as well as the surface should be flooded if possible. This, however, is seldom possible. Where a soil fire has a good start it may be cheaper to blast a ditch than to dig one. Well-placed dynamite will do effective work in a short time.

CROWN FIRES: We have few crown fires in Pennsylvania. Natural conditions as to topography and growth are the best means of stopping any that may occur.

SURFACE FIRES: This is the kind of fires which occur most frequently in Pennsylvania. If there is little wind the flames may be put out by beating with branches (pine preferred), shovels, and wet burlap. Fire fighters should beat the flames with a side sweep toward the fire to avoid spreading sparks. Sweeping with old brooms, brooms made of branches, or steel brooms, is better than beating. The burning material may be pushed back upon the burned-over ground with rakes, sticks, forks, or other tools. The idea is to separate the burning material from that not yet afire. Water is always effective, but too frequently dependence is placed on it, and when it is not available fire fighters seem to be at a loss to know how to make their attack. The fire can be smothered by throwing on dry or moist sand or dirt. If it is possible to plow, a furrow may be thrown up quickly to restrict the spread of the fire.



How a Forest Fire Burns When There is no Wind.*

Sometimes small or lightly-burning fires are beaten out. If no trail is cleared to the bare ground entirely around the burned area, here and there small pieces of smouldering wood may be fanned into flame and the fire may again break out. **It is always a safe practice to make a clean trail with exposed mineral earth entirely around the burned area.**

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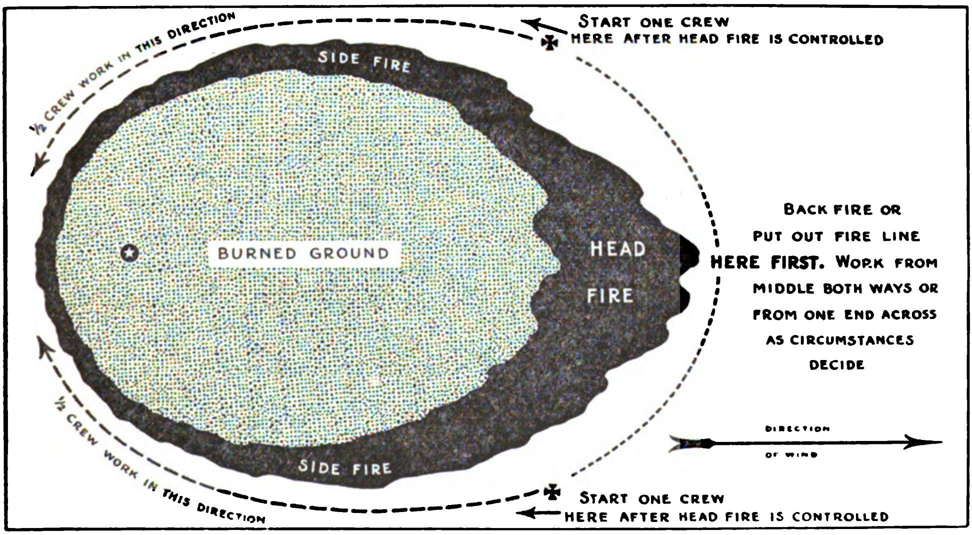
*This cut and those on pages 11, 13, 17, and small one on 16 from New Jersey circular.

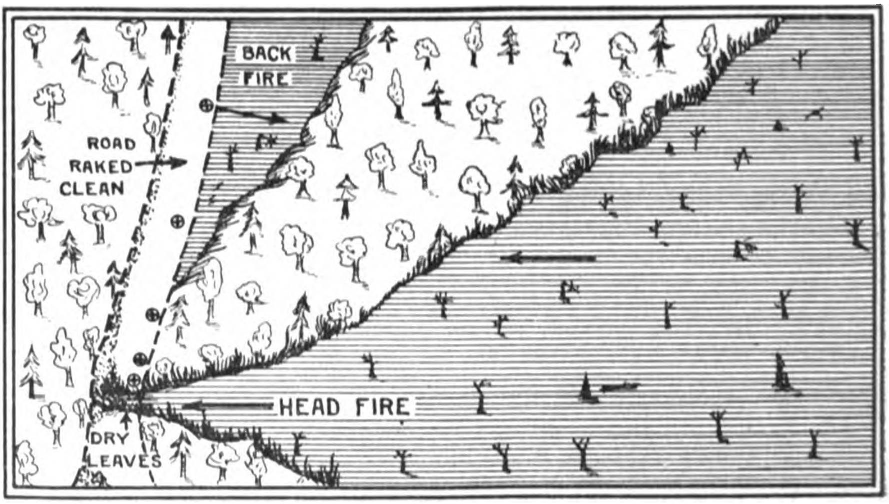
Chemical extinguishers are sometimes used. Careful tests have been made by foresters and it has been found that the chemical spray is of no more value in the woods than is plain water with a little force back of it. This force can be supplied by a foot pump, or by air pressure, as in the ordinary fruit spraying devices. Sprinkling water in front of the fire reduces the force of the flames and permits close beating and raking. To be effective, considerable water is required when it is sprinkled directly on the flames. Water is used to the best advantage when the stream is thrown at the ground immediately in front of the flames. The water and force combined will stop the flames' advance. It is also satisfactory to spray water against the base of the flames from the rear particularly if there is much smoke.

BACK-FIRING: When the wind is strong or when the flames are in slash, fallen logs, dead ferns, bracken, or grass, fire becomes so intense that it is unsafe and impracticable to attempt close attack. Back-firing is resorted to in such cases. It should be remembered that fire is a dangerous force and that when fire is fought with fire extreme care and keen judgment must be used. If a fire starts some area will be burned-over and some growth will be damaged, but in order to reduce the damage as much as possible some additional sacrifice may have to be made by starting a back-fire. The area to be covered by the back-fire should, however, be kept as small as is practicable.


½ CREW WORK IN THIS DIRECTION
START ONE CREW HERE AFTER HEAD FIRE IS CONTROLLED
SIDE FIRE
BURNED GROUND
HEAD FIRE
BACK FIRE OR PUT OUT FIRE LINE HERE FIRST. WORK FROM MIDDLE BOTH WAYS OR FROM ONE END ACROSS AS CIRCUMSTANCES DECIDE
DIRECTION OF WIND
SIDE FIRE
½ CREW WORK IN THIS DIRECTION
START ONE CREW HERE AFTER HEAD FIRE IS CONTROLLED

The Correct Way to Attack Any Forest Fire. Always Work From in Front Toward the Rear. Stop the Head Fire First and Work Far Enough to Each Side So That the Side-fire Cannot Work Around to Make a New Head-fire.

Frequently under excitement, the speed at which the original fire is traveling is misjudged and a back-fire is started too close to it or too far in advance of it, usually the latter. Occasionally a back-fire has been set at the foot of a mountain along a road to stop a fire just coming over the top. Sometimes a land owner has set a back-fire along his property line without regard to where it may go or where the original fire was. Indiscriminate back-firing cannot be condemned too strongly. A lack of information regarding the locations of fire breaks already established and the topography may result in errors in back-firing. (Everyone should be on the watch for such cases and report them.) Such errors should be reported to the person in charge of the fire-fighting crews. After the necessity for starting a back-fire has been determined—and not before—the back-fire should be started as close to the main fire as practicable. Sometimes back-fires do not stop the original blaze. In that case the crew must drop back to a second line of defense and renew the attack. The retreat should be made promptly and the new fight started at once from the most advantageous position.



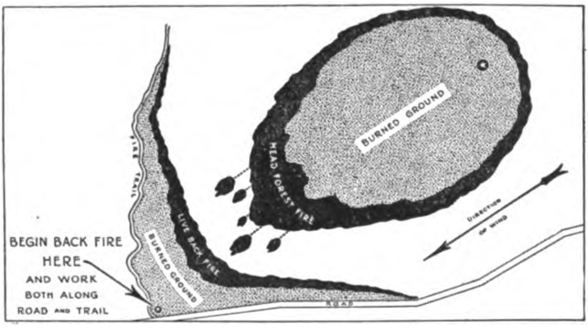
The Incorrect Way to Attack by Back-fire. The Head-fire Reaches the Fire-break and Jumps Over it Before the Back-fire Reaches the Point of Advantage.

Fire burns slowly down hill, and rapidly up hill. Therefore, a good place to start a back-fire is just over the brow of a hill up which a fire is advancing on the opposite side. Fires burn slowly against the wind and rapidly with the wind. The heat and draft from the advancing fire attracts the heat from the back-fire and hastens the advance of the latter when the two are approaching. Observation of the force and direction of the wind will give warning in time to protect the men. It will also indicate whether a quick advance should be made to another point that is threatened by the flames.

A back-fire should be started from a fire-break, such as a road, stream, or other natural barrier. In case a fire-break is not found at the proper place for back-firing, one must be made. The ground should be cleared so that the damp mineral soil is exposed. Such a trail can be made very quickly even through brush with forked sticks, if no other tools are available. Of course, axes, brush hooks, rakes, hoes, shovels, and brooms are better tools.

A Back-fire should be Started at a Road, an Open Trail or a Stream.

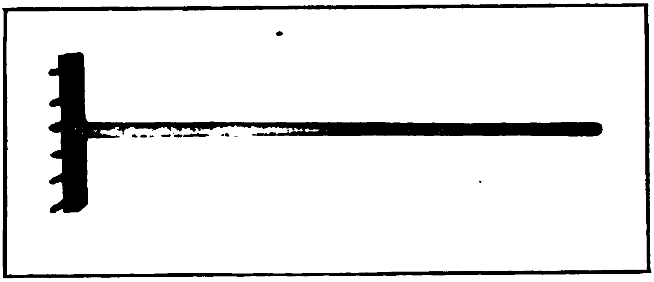
Usually the smoke is thickest, fighting is most uncomfortable, and danger of spark-spreading is greatest in line with the draft of the fire. The back-fire should be started at this point, and every man available is needed there. The back-fire should be started at the lower point of a V, the sides of which are open enough and extended far enough to include the header of the advancing fire. The whole crew is available to attack promptly the spot fires in case sparks cross the fire-break. As soon as the header is halted the side lines of the back-fire may be drawn in close to the side lines of the main



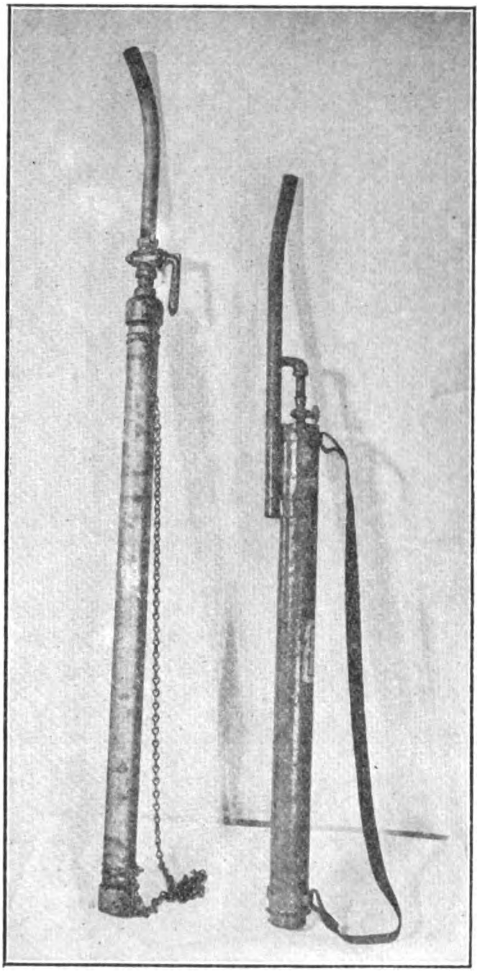
Where an Angle Can be Used, the Back-fire May Have to be Longer, But the Area Burned by the Back-fire is Reduced. Be Careful that the Side-fire Does Not Come Up Before the Wings of the Back-fire are Safe.

fire and continued parallel to them, or even run into them. The rest of the fire-line may be beaten out. Remember, however, that a trail cleared to mineral soil should extend entirely around each fire to make it safe. The crew, even if small, should be divided at the point of the V, with a few more men on the side which should be advanced more rapidly or on which the danger is greater because of the wind.

A satisfactory arrangement of crews is as follows: the warden or foreman directs the course and location of the fire-break, if one must be made. He is in charge of the whole fire-fighting force and should urge each man to do his best. According to the amount of brush to be cut one or two axemen or brushcutters follow the warden. Four men with small wooden rakes, or some other tool, one working close to the other, make a clean trail, exposing the mineral soil, raking the material to the side away from the fire unless it is needed to start a back-fire. Next comes a man with a torch. He must not set fire too rapidly for the nearest raker, nor for the guards who follow him. If the torchman sets fire too rapidly for the rakers the heat may drive them off their course, and if too rapidly for the guards, the fire may not burn away from the trail fast enough to permit their moving up with the torchman. As a result sparks may blow across the trail where there will be no one to discover and stamp them out immediately. Four alert and active guards can take care of a long line of back-fire. They should have three-gallon spray tanks and a continuous supply of water. They should have also a rake or broom. Pine brush may be used in the absence of a better tool. The rear guard must be the most dependable man in the crew for he must determine when the line is safe and must not leave it until it is safe. It is important that someone who knows the woods after dark should be detailed to carry water.

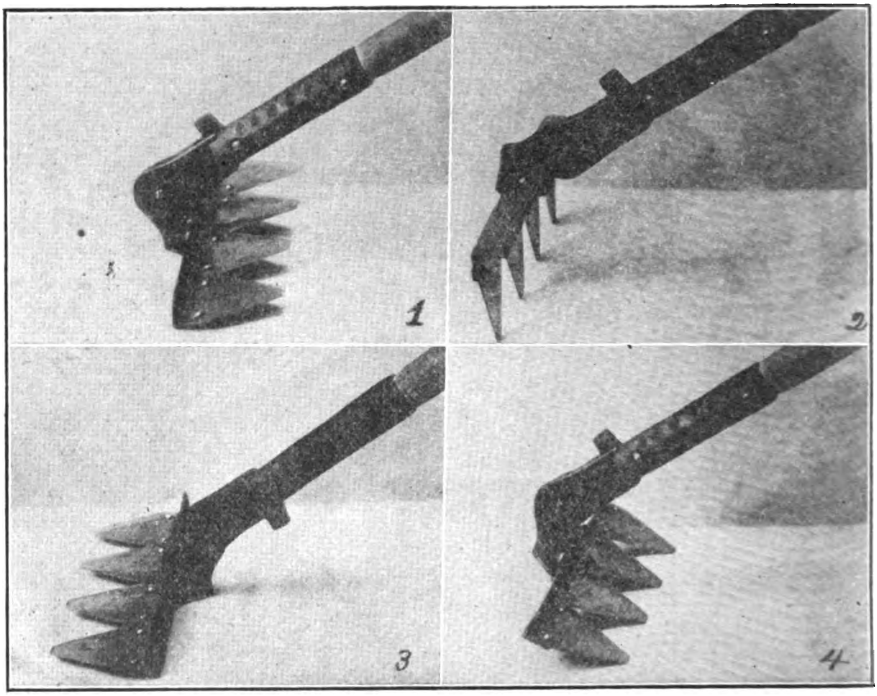


A Wooden Rake Makes a Clean Trail.



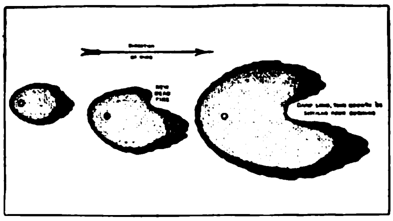
Back-fires Are Started With Torches—

Some authorities do not recommend a back-fire except as a last resort. There is no reason, however, why the principles of back-firing may not be used at every fire, no matter how small. Some persons recommend that a fire should be attacked where it is first met. This point, however, may be where it is doing the least damage. The essential point in forest protection is not merely to put a fire out, but to put it out in the shortest possible time, to restrict it to minimum area and damage. Therefore, it should be attacked where it is making most headway or where it is doing most damage. Some recommend attacking a fire on the side-line near the front. They contend the front is gradually narrowed and weakened until it is easily subdued by reducing the amount of fire and draft. There is some merit to this method, but it is a makeshift.



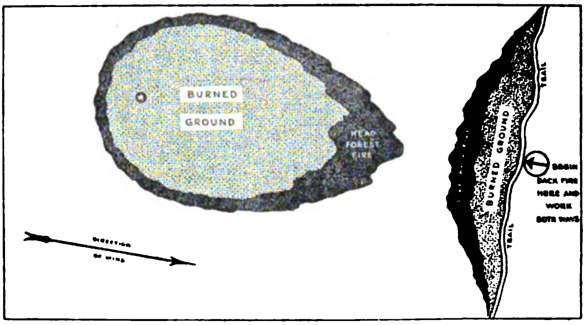
The Rich Fire-tool, Which Can Be Adjusted Into Four Positions, is the Most Effective Fire-fighting Instrument.

When fire runs into rocks, or burns over a very rocky area, it may be necessary to do considerable quarrying to establish a safety trail around the burned area. In such cases it may be necessary to start a back-fire at the outer edge of the rocks and let the fire smoulder under them. This should be done only after careful consideration of expense and damage.



How a Side-Fire May Develop a New Head-fire.

In rough hilly country several headers may develop because of topography. The size of the force available will determine how these headers should be handled. After one header has been subdued a change of wind may cause this situation to arise. It is always poor policy, therefore, to delay the attack on both side lines. As long as a flame burns prompt and continuous action is required.



If Worked Straight Across the Head-fire, the Back-fire Must Be Long Enough to Check Not Only the Narrow Head-fire, But Also the Full Width of the Fire Behind.

The foregoing illustration is described by a forester as follows: "It is useless to try to head off a fire ascending a steep slope. My method has been to start a back-fire at the top of the slope, dividing my men into two crews, each running a line away from the other, at right angles to the direction of the oncoming fire until it is safe to run the line down the slope in the direction of the fire, flanking it and finally catching it in the rear." This is a satisfactory method of attack.

Occasionally a back-fire is started at the bottom and diagonally to the slope of a hill. As a result, usually the uphill draft causes the fire to move more rapidly than the men can handle it, and it sometimes gets away. If this method is necessary, the back fire should be started at the top and worked down, running directly with the wind or at an angle to it. It pays to take the time to walk up a hill before starting the back-fire.

It is advisable to do some thinking after a fire has been extinguished. Review the plan of attack and consider whether better plans might have been made so that the fire could have been more quickly and more easily extinguished.

THE LAST SPARK: No fire is out until the last spark is dead. Sometimes wardens and men leave as soon as the flames have been extinguished, with the result that frequently the fire has started up again at one or more places. Then the fire has to be fought again; it is larger, is harder to subdue, takes more time, costs more, burns over more area, and does more damage than the first fire. No chances should be taken with its breaking out a second time. All but the most dependable men should be discharged. The burned area should be inspected to see that there is no danger of fire creeping across the trail which ought to have been cleared around the burned area. Threatening brands should be thrown far into the burned area; logs and branches holding fire should be rolled over and sprinkled with water or covered with dirt until they are safe. Punky stumps should be examined and broken apart to see that they can give off no sparks. Burning snags standing within several hundred feet of the unburned area should be cut down. Every precaution should be taken to prevent a recurrence of the fire. If a fire has been put out during the day, the tract should be patrolled until the wind goes down in the evening, or until dew falls. If the fire has been extinguished in the morning and there is the least danger of its starting again, the area should be patrolled until the next afternoon or evening.

No fire is out until the last spark is dead.

FOREST TREE PLANTING

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST COMMISSION

Robert Y. Stuart, Commissioner of Forestry.

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FOREST TREE PLANTING

WHEN TO PLANT
WHERE TO PLANT
WHAT TO PLANT
HOW TO PLANT

By
John W. Keller,
Chief, Bureau of Silviculture

BULLETIN 28

PENNSYLVANIA DEPARTMENT OF FORESTRY
ROBERT Y. STUART, Commissioner
1922

INTRODUCTION

THERE are 13,000,000 acres of timberland in Pennsylvania. A large part of this area is not producing what it can and should. If fires are kept out, many acres of it will come back with a satisfactory growth of trees, but there are 3,000,000 acres that are absolutely idle and should be planted with trees at once. Without planting, it will require half a century for this idle land to be satisfactorily restocked with trees, and in this time the area is capable of producing enough timber to supply the entire State of Pennsylvania for twenty years at the present rate of consumption.

Wood is vitally essential to our people, and the rapidly growing industries of our State. None of us can get along without it. The country dweller can get along with less than the city dweller because it not only takes wood to grow food but, after it has grown, it must be packed in wooden boxes or barrels and transported in wooden cars or wagons before the city man can eat it. The lack of wood will mean physical and industrial decay to our own strong and properous commonwealth.

The State of Pennsylvania recognizes its responsibility in making every acre of idle forest land produce and will gladly supply you, free of charge, with trees for reforestation.

Forest tree planting methods that have been tried and are successful are discussed on the following pages.

FOREST TREE PLANTING

WHEN TO PLANT

FOREST tree seedlings should be planted in the spring after the frost has come out of the ground and before the new growth has started, or, in the fall before the ground is frozen. Whenever possible, planting should be done during the spring because the trees will begin to grow at once, and usually more of them succeed.

If labor is not available in the spring, planting in the fall can be undertaken with reasonable assurance of success under the following conditions:

First, when the soil is not heavy clay and the danger from heaving will be slight.

Second, when the area is not a "frost pocket," i. e., subject to severe frosts.

Third, when the planting site has a northern exposure and the frost leaves the ground late in spring.

Fourth, when the trees to be planted start to grow early in spring, such as American larch, European larch, Japanese larch and wild black cherry.

One tree-planting enthusiast wrote:

"I am planting for timber. It is better than bonds."

WHERE TO PLANT

IDLE lands that are not needed for, or not adapted to, agricultural or other more important uses, should be planted with forest trees. These lands usually come within one of the following classes:

Class 1. Cleared lands, such as abandoned fields and worn out pastures, eroding banks, slopes and gulleys, odd and unused corners about the farm, along highways and water ways.

Class 2. Worn out farm woodlots which are growing up with undesirable trees or do not support a satisfactory stand of valuable young growth.

Class 3. Areas on which a windbreak is needed to protect buildings, live stock, orchards and crops.

Class 4. Burned over areas covered with bracken, sweet fern, aspen and fire cherry upon which small seedlings of desirable trees are not coming in naturally.

Class 5. Scrub oak barrens on which growth of oak, chestnut or other valuable trees are not present in sufficient quantities to insure a satisfactory forest crop. These areas should be planted immediately after the fire has killed the scrub oak sprouts. If planting is done under sprout growth the planted trees will often be killed by the dense shade.

Class 6. Areas upon which the chestnut has been killed by the Chestnut Blight and a satisfactory stand of other valuable forest trees has not come in.

More than 34 million trees have been planted on State Forests during the last twenty-one years. The plantations now cover 22,500 acres.

COST OF PLANTING

A PLANTING crew of two men can usually set out from 1,200 to 1,600 trees in a ten hour day. If the trees are obtained from the Pennsylvania Department of Forestry the packing charges at the nursery will amount to approximately 75 cents per thousand trees, and the transportation charges will cost about 35 cents per thousand trees. Under average conditions the total cost of planting an acre with forest tree seedlings should not be more than $12.00.

WHAT TO PLANT

IT is best to plant trees that grow naturally in a locality. These trees will usually thrive under similar conditions when properly transplanted. Large plantations of foreign trees should not be made unless experiments have proven that they will thrive in the places where they are to be set out. Thirty years of experience in planting European and Japanese larches, Norway spruce and Scotch pine in this State indicates that these trees can be planted on properly selected sites with reasonable assurance of success.

More evergreens will be planted than hardwoods, because they are more easily transplanted. They usually grow faster, are more attractive, produce a larger amount of lumber per acre, and their wood can be used for general purposes and is in large demand. Nevertheless, the wood of walnut, ash and oak is so valuable for special uses that planting of them is recommended on moist, fertile soils which are not more valuable for agricultural or other uses.

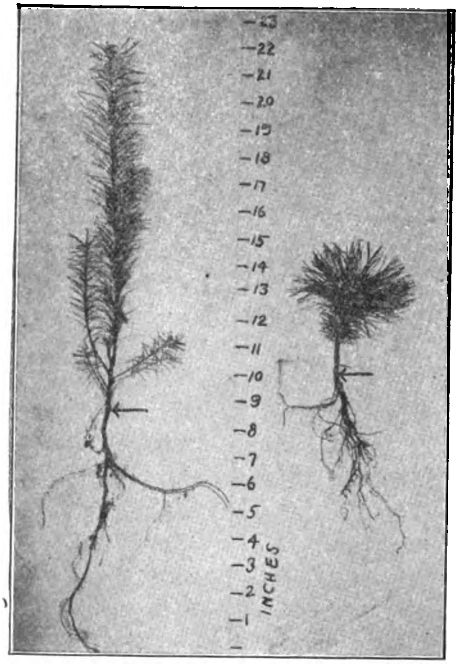
The most important factors in determining the kind of trees to plant are soil and moisture. The greatest care should be used in selecting the kind of trees that will thrive under the conditions existing on the proposed planting site. Any of the trees listed in this bulletin are recommended for planting in Pennsylvania.

AGE AND SIZE OF PLANTING STOCK

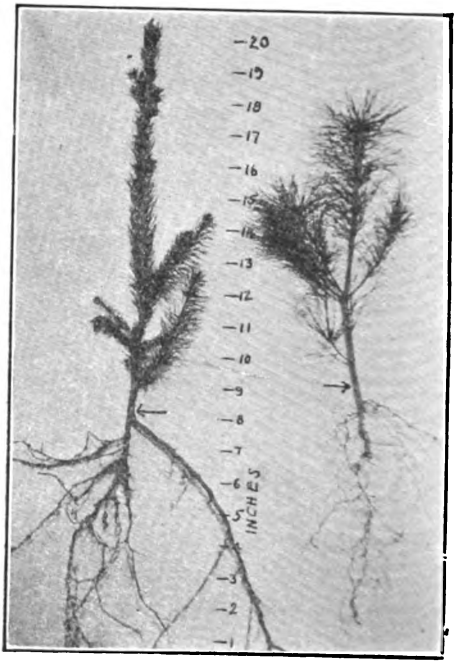
THE age and size of the planting stock depends largely upon the condition of the planting site. If no heavy sod, dense weeds, or sprouts grow on the area, trees from 4 to 8 inches in height may be planted. This will result in the largest number of living trees at the lowest planting cost. The larger the planting stock the greater will be the cost of planting, and the harder it will be to get the trees to grow. Consequently small planting stock should be used unless there is good reason for doing otherwise.

As a general rule, trees of the following ages are the right size for the usual planting site in Pennsylvania:

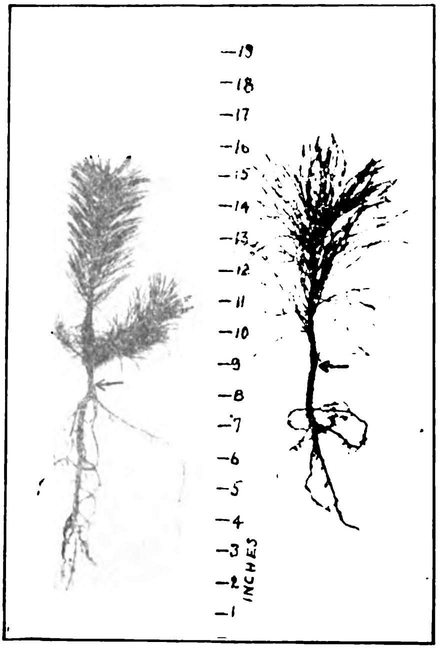
White pine	**2 or 3 yrs.**	**Walnut**	**1 yr.**
Pitch pine	**2 yrs.**	**Ash**	**1 yr.**
Red pine	**2 or 3 yrs.**	**Black locust**	**1 yr.**
Norway spruce	**3 or 4 yrs.**	**Red oak**	**1 yr.**
Larch (Japanese or European)	**2 yrs.**	**Sugar maple**	**1 yr.**



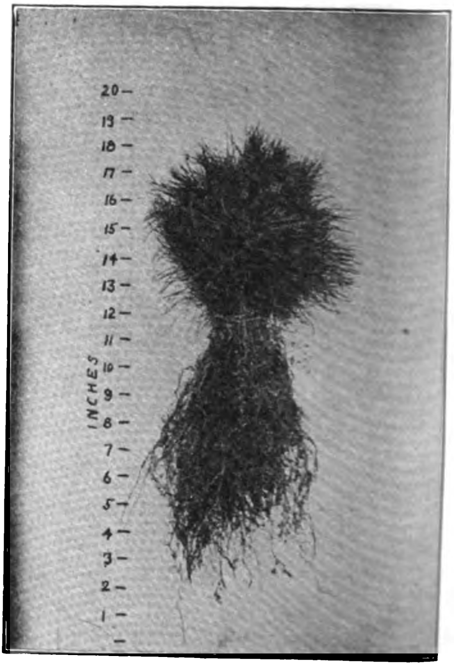
Japanese larch (left) and white pine (right), two years old.



Norway spruce (left) and white pine (right), three years old.



Pitch pine (left) and Scotch pine (right), two years old.



A bunch of 50 white pine seedlings, two years old, ready for packing and shipping.

HOW TO PLANT

IMMEDIATELY upon receipt, the trees should be taken to the place where they are to be planted. If they cannot be set out the same day they should be "heeled in." For this purpose select a place in well-drained soil which is not stony and where water is available. An open trench should be dug with one side almost vertical. Take bunches of trees from the shipping boxes and wet the roots thoroughly. Then cut the strings and place the trees upright in a thin layer against the vertical side of the trench. A bunch of trees should be spread over about six inches in the trench. Fine soil should be placed against the roots and lower part of the stems, and firmed with the foot.

Trees should be "heeled-in" if they cannot be planted the day they are received.

Fourteen additional forest tree nurseries were started in 1921 and 1922 at State institutions. The seedlings grown in those nurseries will be distributed free by the Pennsylvania Department of Forestry.

THE PLANTING OPERATION

THE roots must be kept moist at all times. If they are allowed to dry out the tree may die. Two persons make a good planting crew, a mattock man to dig the holes and a planter to set the trees. Dig the holes in rows. The distance between rows, and also the distance between trees in each row, is usually five to six feet. The spacing will depend upon the kind of trees used, the quality of soil, and on what is now growing on the area.

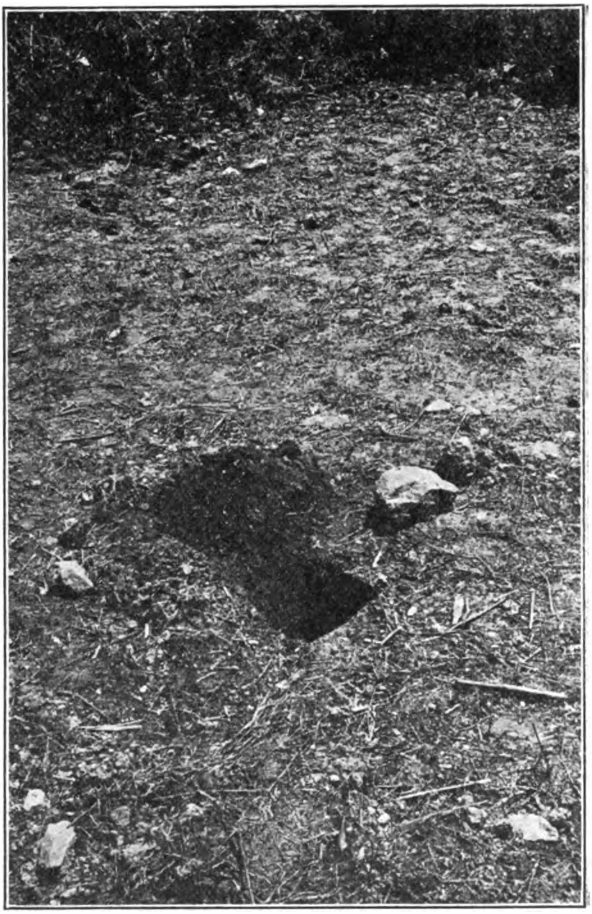
Where the ground is not stony nor the sod heavy, one stroke with the mattock will usually make a hole large enough to plant a 2-year-old seedling. The hole should be big enough to let the roots spread. Loose dirt is carefully drawn to the edge of the hole where it can be easily reached by the planter. If the sod is heavy at least one square foot should be turned back with the mattock, and a hole made in the loose earth.

The planter with a supply of trees in a pail follows the mattock man. The pail should contain about an inch of water to keep the roots moist. Holding a tree in his left hand the planter sets it in the hole as deep as it was in the nursery, as shown by the "collar" on the seedling. The roots should be spread out and loose earth pressed over and around them with the right hand. The remaining loose dirt is then drawn into the hole and packed firmly with a mallet, a stone, or the heel of the shoe. No grass, leaves, or stones should come in contact with the roots. When properly planted the seedling will stand upright and be so firm that it cannot easily be pulled up.

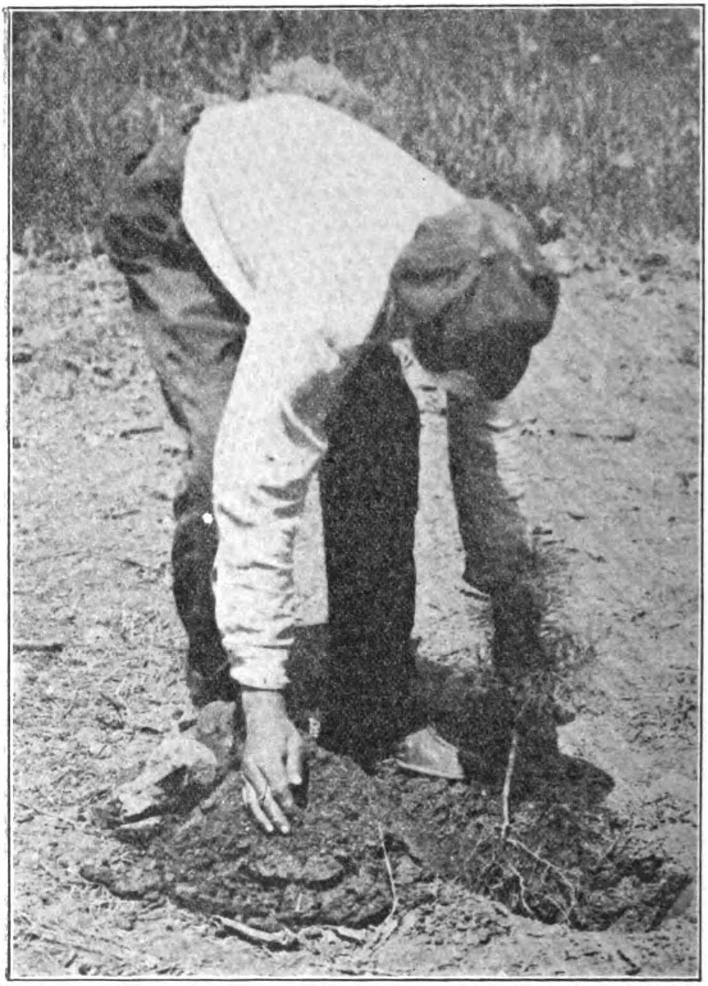
An annual demand for 20,000,000 forest trees and for 15,000 shade and ornamental trees is expected by the Department of Forestry officials by 1925.

Two persons make a planting crew, a mattock man to dig the holes and a planter to set the trees. Carry the trees in a bucket so that the roots may be kept moist at all times.

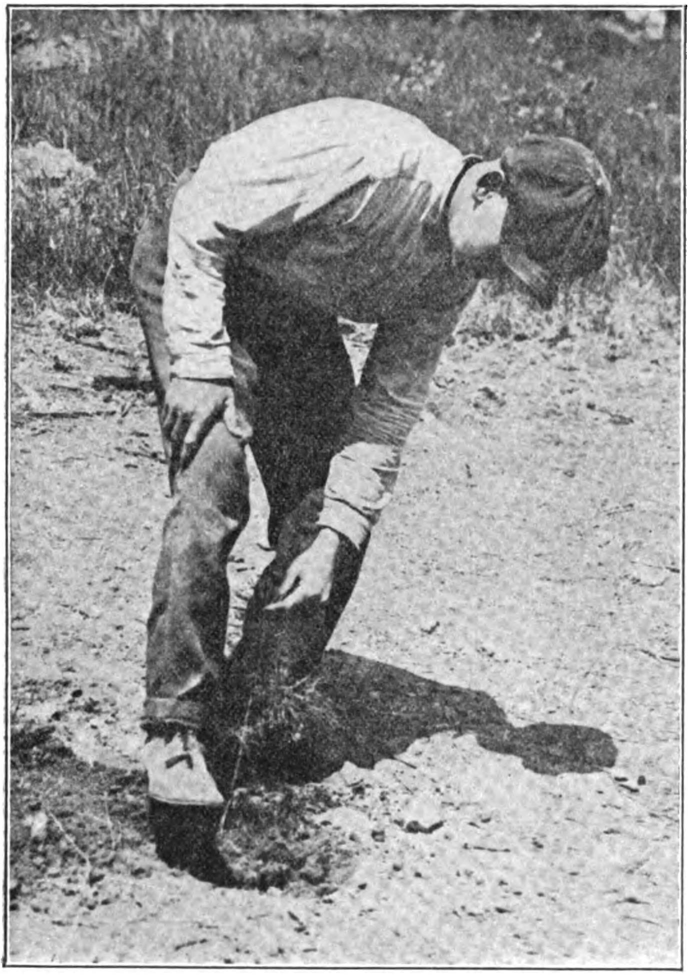
One stroke with the mattock will make a hole large enough to plant a tree. If the sod is heavy one square foot should be turned back with the mattock and a hole made in loose dirt.



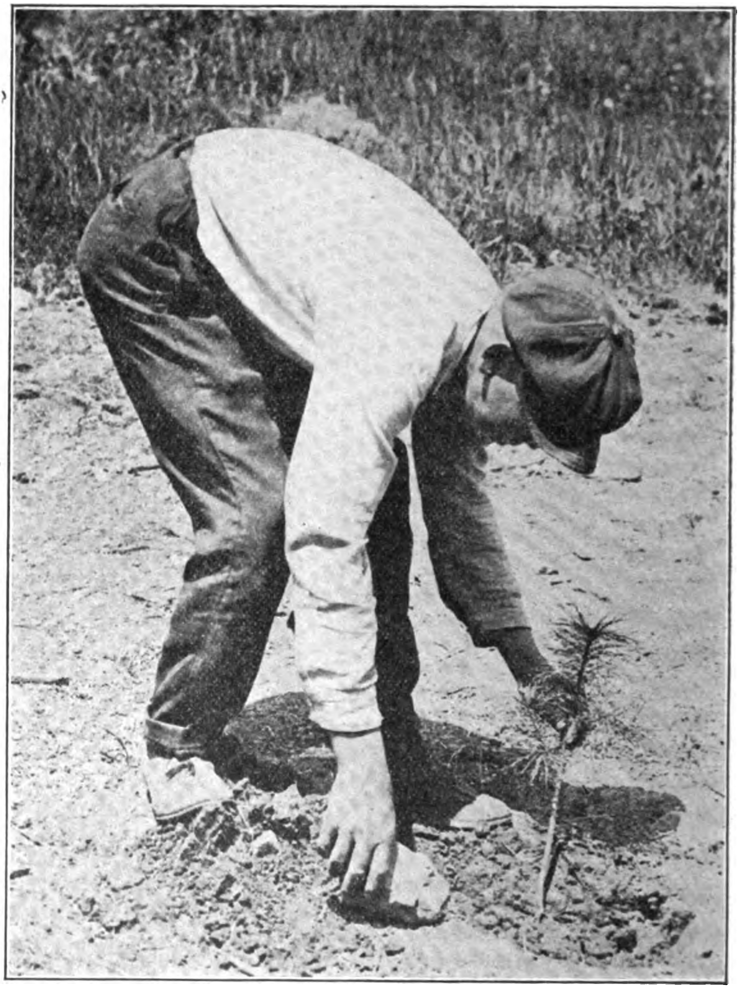
Loose dirt, carefully drawn to the edge of the hole, can be easily reached by the planter.



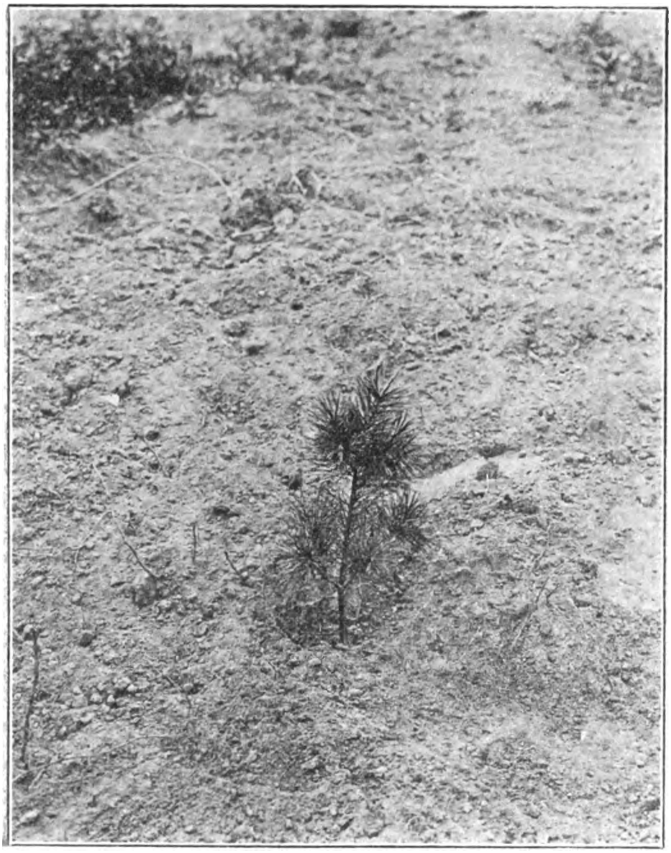
With his left hand, the planter sets the tree in a hole as deep as it was in the nursery. The roots should be spread out and loose earth pressed around them.



Loose dirt is packed firmly around the roots with the heel of the shoe.



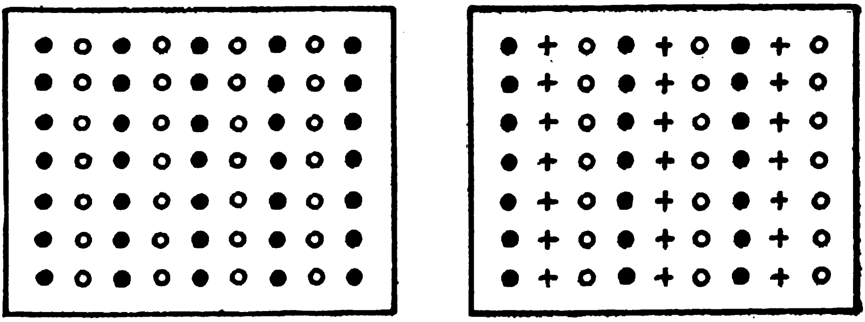
A stone is very effective in packing the dirt tightly around the roots.



When properly planted the seedling will stand upright and be so firm that it cannot easily be pulled up.

PROTECTIVE MEASURES

AS a rule each destructive insect or disease attacks trees of one species only. Nearby trees of other species may not be affected. The chestnut blight attacks only the chestnut, the white pine weevil attacks chiefly the white pine and the locust borer works wholly in the black locust. To guard against loss from insect attacks or diseases, areas larger than an acre should be planted with a mixture of two or more kinds of trees that have the same needs for soil and light and the same rate of growth. This can most easily be done by alternate rows, as shown in illustration below:



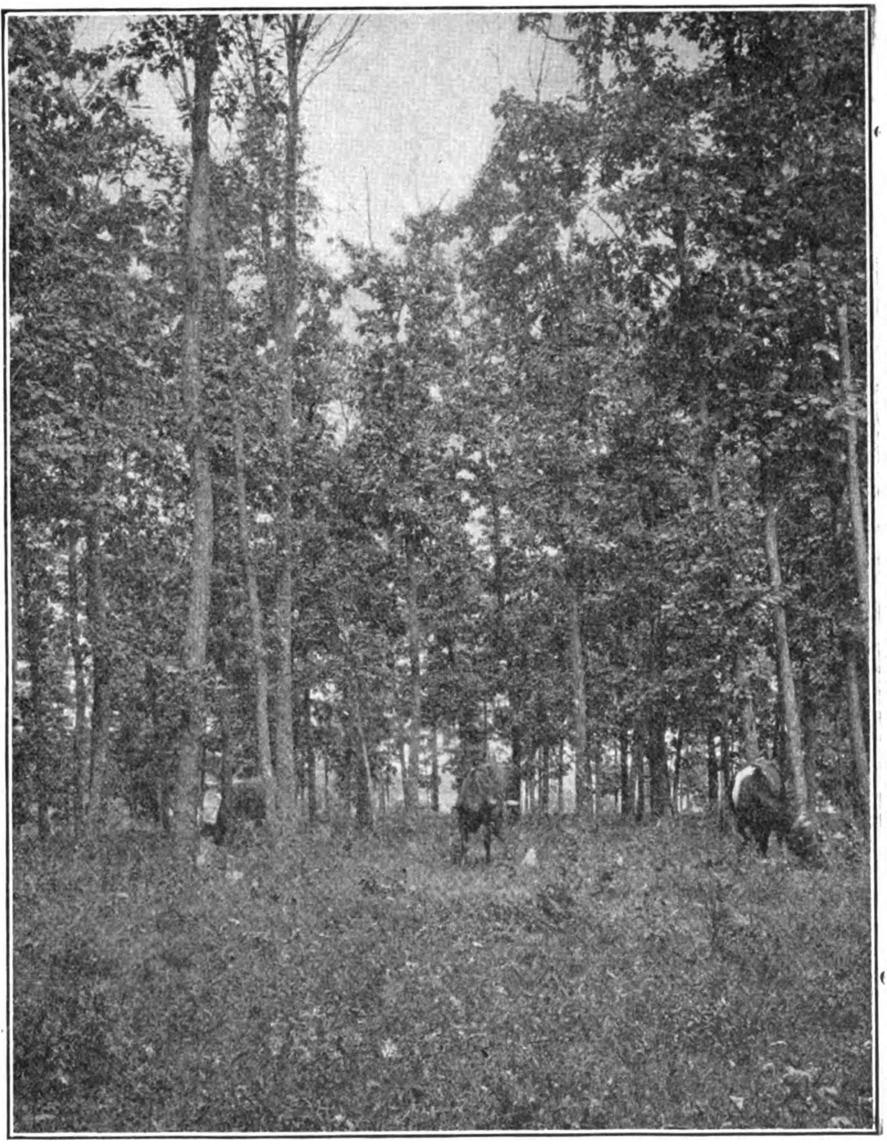
Using two species

Using three species

ALTERNATING BY ROWS.

When white pine is planted all cultivated or wild currant and gooseberry bushes growing within 900 feet should be destroyed. The best way is to pull them up by the roots and hang the plants on nearby trees or brush so that they cannot take root again. This is to guard against the Blister Rust, a fungus disease that kills white pines. The Blister Rust cannot spread from pine to pine but must spend a part of its life on the under side of current and gooseberry leaves, from which spores spread to the pines and cause the rust.

Live stock will eat the leaves and tender twigs of hardwood seedlings and root up, break and tramp down small evergreens. No plantation can succeed when animals are allowed to graze over or root up the planted site.



Livestock will eat the leaves and tender twigs of hardwood seedlings and root up, break, and tramp down small evergreens.

PROTECTION AGAINST FIRE

FOREST fires have devastated more than one-third of the forest area of Pennsylvania. Even a very light burning will kill small trees. Hence, fires must be kept out. On a farm this danger is usually slight, and little need be done except, possibly, the posting of a few forest fire notices. When a plantation is made near large wooded areas where fires are likely to occur, or if the plantation is large and destruction would involve heavy loss, special precautions should be taken. In addition to posting fire warnings, this can best be done by cutting fire lines or by putting on a patrol during dry seasons.

During the last thirteen years, private planters have received from the Pennsylvania Department of Forestry 18,250,000 young forest trees which were set out in all parts of the State.

GROWTH TO BE EXPECTED

THE following tabulation gives a summary of the number of years that will be required to mature some of our most important forest trees on sites best adapted to each of them. The most common uses of the wood produced by these trees are also listed:

Kind	Where To Plant	Years To Mature On Best Sites	Uses of Wood
Carolina poplar	Moist fertile soil	25	Pulp, crates.
Black locust	Dry sterile soil to fertile loam	30	Posts, ties, insulator pins.
White ash	Rich moist soil	50	Implements, furniture, handles.
Red oak	Loam to sand or gravely soil	75	Furniture, interior finishing, ties.
Black walnut	Rich, moist bottom lands	60	Furniture, gun stocks, veneer.
Sugar maple	Deep fertile soil to rocky hills	75	Furniture, interior finishing (maple sugar).
Larch (European or Japanese)	Well-drained medium fertile soil	40	Poles, posts, ties, mine timbers.
Pitch pine	Medium fertile soil to dry slopes	60	Construction timber, mine props, ties.
White pine	Fertile well-drained soil to gravely hillsides	50	Lumber, wooden ware, excelsior.
Red pine	Deep loam to dry sand and gravel	60	Construction timber and lumber.
Norway spruce	Deep moist to thin cold soils (will not thrive in wet locations).	75	Construction lumber, pulp, thinning for Christmas trees in 8 years.

PLANTING STOCK

TREES for reforestation are distributed by the Pennsylvania Department of Forestry under the following conditions:

1. They must be planted in Pennsylvania.
2. They must be planted by the applicant or his representative, and may not be offered for sale or be sold.
3. They should be set out in accordance with the best and most practical modern methods.
4. The planted trees must be protected, as far as possible, from fire, grazing, trespass, and other destructive agents.
5. Fewer than 100 trees cannot be furnished to one applicant.

In the spring of 1922, the Pennsylvania Department of Forestry gave without cost 3,500,000 trees to 1,200 private planters in this State.

AGRIC. REFERENCE ROOM
EXCHANGE
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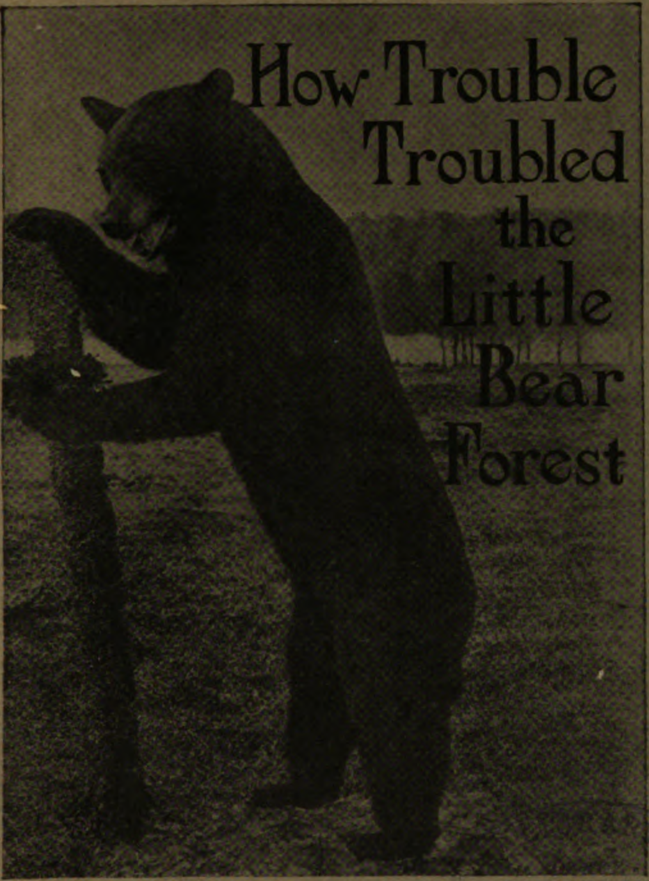

How Trouble Troubled the Little Bear Forest

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BULLETIN 30

PENNSYLVANIA DEPARTMENT OF FORESTRY
ROBERT Y. STUART, Commissioner
January, 1923

"We hope that we have had our last fire this season and that all persons using the State Forest from now on will be very careful.

"In a few weeks you will be hunting new locations for your camps; and from the interest you have shown, the careful attention you have given my instructions and as a result of this experience I know you will not be careless campers. And now before we leave this hall let us rise and repeat the pledge we took some time ago."

At the signal the children rose, and from the dozens of throats came the strong response, "we pledge our allegiance to our country; to her flag and all it stands for; to her forests and their future."

The Forest Situation

IN

Pennsylvania

MAI 8

BY

JOSEPH S. ILLICK
Chief, Office of Research

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ROBERT Y. STUART, Commissioner
January, 1923

PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST COMMISSION

R. Y. Stuart, Commissioner of Forestry.

Edward Bailey.

Henry W. Shoemaker.

Mrs. John L. Lawrence.
(Mary Flinn Lawrence.)

Henry S. Drinker.

Lewis E. Staley, Chief, Bureau of Operation.

George H. Wirt, Chief, Bureau of Protection.

John W. Keller, Chief, Bureau of Silviculture.

Alfred E. Rupp, Chief, Bureau of Lands.

Joseph S. Illick, Chief, Office of Research.

W. Erdman Montgomery, Chief, Office of Maintenance

A. O. Vorse, Chief, Office of Information.

E. A. Ziegler, Director, State Forest Academy.

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THE FOREST SITUATION IN PENNSYLVANIA.

The forests have, in all ages and in all countries, for a time at least, been squandered by man with a careless disregard of the future, Pennsylvania— the only State in the Union that embodies the word "forest" in her name—is no exception, for her forests have been wastefully exploited, and, until recently, no effective measures for their renewal have been put into practice.

The first settlers of Pennsylvania lived among a rich forest heritage which made possible much of the prosperity of the past and resulted in good that is still flowing forth to all of us. Great and green forests once covered every hill and all the valleys of the State. The original forest was an enormous wood reservoir. It has been drawn upon so heavily and neglected so long that it is now almost empty and in a very unsatisfactory condition. This great forest heritage was received at little or no cost. People began to use it unsparingly and gave little or no conscious care to its perpetuation. Where once stood fine stands of choice timber there now remain vast stretches of devastated forest land.

In 1860 Pennsylvania stood first among the states of the Union in lumber production. Now she holds eighteenth place. She has passed from a position of leadership to a place of dependency in the field of lumber production. Once the State was forest-rich. Now we are forest poor. Our present forests are poorly stocked with inferior material. They are producing through growth only about one tenth of the wood they are capable of turning out. Most of them lack order, are unattractive and in an insanitary condition.

Civilization cannot progress without forest products. We need wood now and future generations will not be able to get along without it. Nothing comes out of the earth or grows upon its surface that is more adaptable to man's needs than wood. It is our duty to take steps toward upbuilding Penn's Woods. We cannot afford to be visited by a serious wood shortage. Our barren hill sides must be converted into growing forests. The application of simple and sound forestry methods will bring about the required improvements. An orderly management of our forests will make them highly productive, attractive, and sanitary.

The data set forth in this bulletin shows the real forest situation of the State. They aim to tell (1) what we once had, (2) what now remains, and (3) what is needed in order to supply our people with necessary forest products.

FOREST AREA OF PENNSYLVANIA.

The original forests of Pennsylvania covered the entire land surface of the State, excepting a few natural meadows and some rough mountain tops. Of the 28,692,480 acres of land in the State at least 28,650,000 acres were originally stocked with a forest growth; and in 1682, when the State was created there remained about 28,592,000 acres of forest land.

The following table gives, by years the approximate area of forest land in the State:

FOREST AREA OF PENNSYLVANIA.

YEAR	ACRES
1600	28,650,000
1682	28,592,000
1820	24,500,000
1860	18,800,000
1922	13,024,399

The foregoing table shows that the marsh of forest destruction in Pennsylvania was rapid. In the early days most of the cut-over land was cleared. This was particularly true prior to 1860. Most of the large lumbering operations between 1860 and 1900 were conducted in the mountainous parts of the State, and during this period only a small percentage of the lumbered areas was cleared for agricultural purposes; and of the land that was cleared a large percentage has since been abandoned and is slowly being restocked naturally with a growth of forest trees.

The forest area of Pennsylvania reached its minimum about 1900, when there were approximately 12,000,000 acres of forest land in the State. From 1900 to 1922 a large acreage of farmland was abandoned, for it was found that most of the cleared mountain land was not suitable for agricultural purposes. This abandoned farmland is being restocked naturally with trees and the total forest area of the State is now (1922) 13,024,399 acres.

On the basis of present indicating factors it seems conservative to estimate that there will be approximately 14,000,000 acres of forest land in Pennsylvania 50 years from now (1972).

AMOUNT OF WOOD IN FORESTS OF PENNSYLVANIA.

The original forests of Pennsylvania were not only vast in extent, but were made up of important timber trees that produced large quantities of valuable wood. The wood that flowed forth from them in enormous quantities was of a superior quality. The following table gives an estimate of the quantity of wood in the forests at specified years in the State's development:

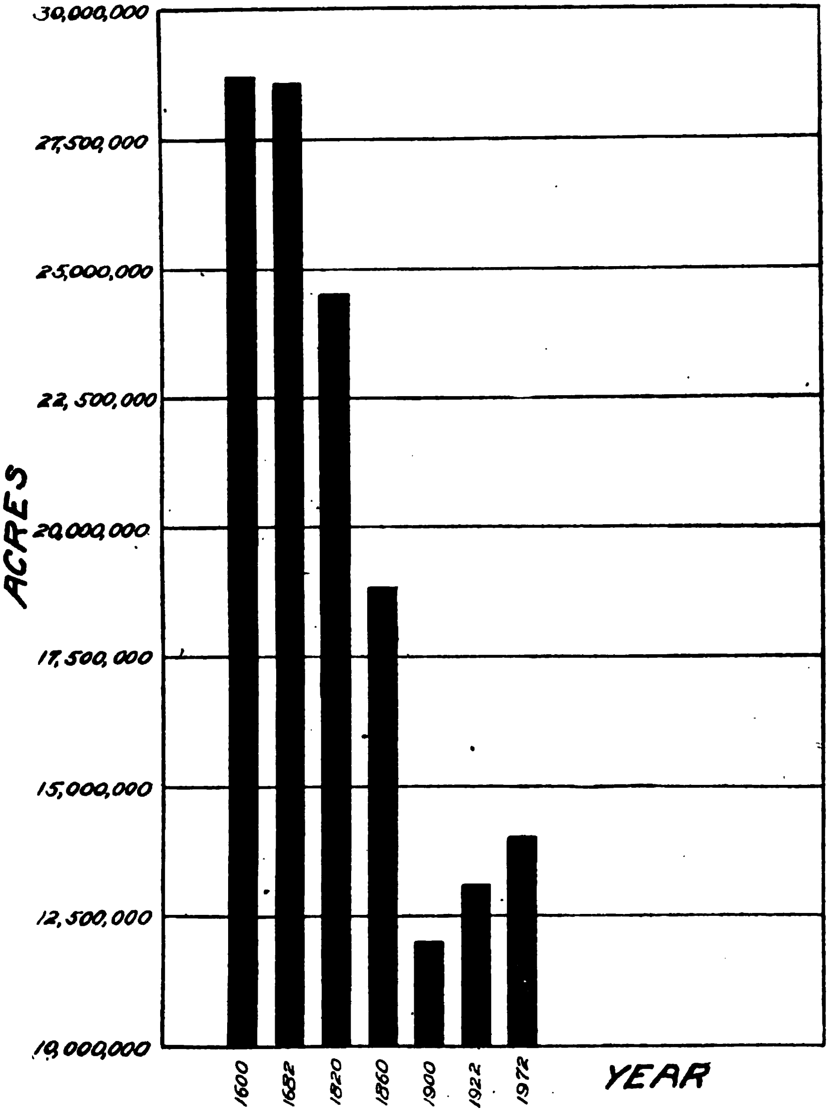
WOOD IN FORESTS OF PENNSYLVANIA

YEAR	VOLUME Board Feet	Cords
1600	501,375,000,000	286,500,000
1820	428,750,000,000	245,000,000
1860	370,000,000,000	186,200,000
1922	11,676,211,200	48,650,881

The average acre carried approximately 17,500 board feet of lumber and 10 cords of wood. On the basis of this estimate there were 501,375,000,000 board feet of lumber and 286,500,000 cords of wood on the 28,650,000 acres of forest land in the State when the white man set foot on her soil.

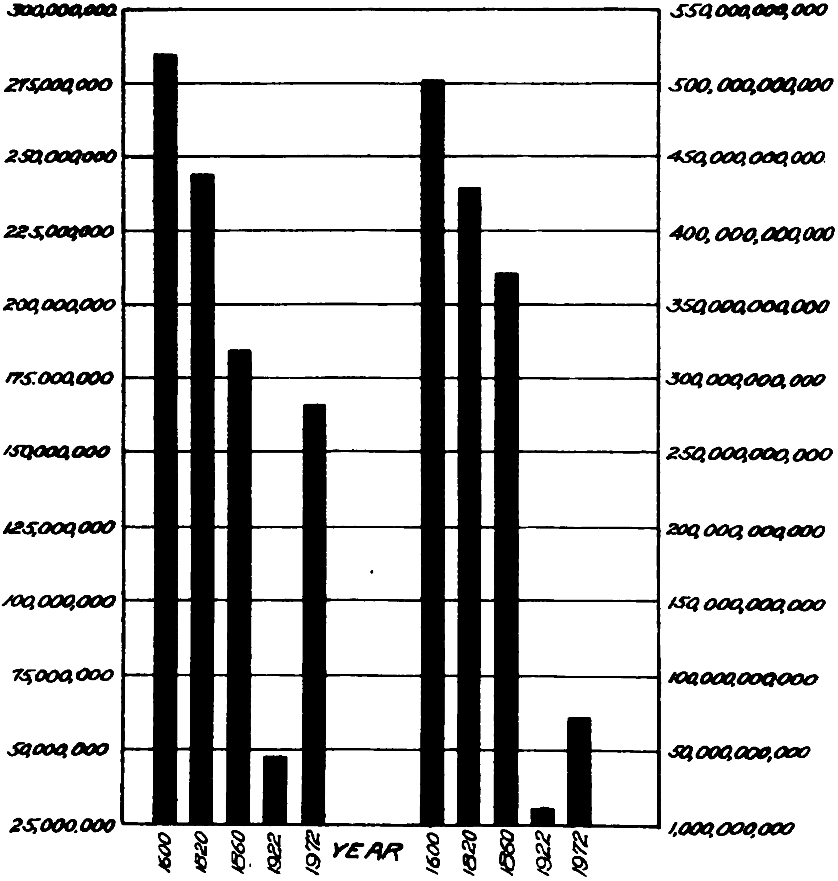
By 1820 the forest area was reduced to 24,500,000 acres. The average acre carried 17,500 board feet of lumber and 10 cords of wood.

FOREST AREA OF PENNSYLVANIA



WOOD IN FORESTS OF PENNSYLVANIA

CORDS AND BOARD FEET



On the basis of this estimate there were 428,750,000,000 board feet of lumber and 245,000,000 cords of wood in the forests of Pennsylvania in 1820.

By 1860 the area of forest was reduced to 18,500,000 acres of original forest and 300,000 acres of completely cutover and second growth forest land, making a total of 18,800,000 acres. The average acre of original forest carried 20,000 board feet* of lumber and 10 cords of wood; and the cut-over and second growth forest land was stocked with an average of approximately four cords of wood. On the basis of this estimate there were 370,000,000,000 board feet of lumber and 186,200,000 cords of wood in the forests of Pennsylvania in 1860.

The forest area of Pennsylvania was reduced rapidly, and now (1922) 13,024,399 acres remain, of which only approximately 25,000 acres can be classified as original forest. The amount of wood on all of this forest land of the State is estimated at 81,084,801 cords. This represents an average of six and one-fourth cords per acre.

Of the total amount of wood—81,084,801 cords—approximately 60% is of cordwood size and 40% may be converted into lumber. On the basis of this estimate there are at present (1922) 48,650,881 cords of wood and 11,676,211,200 board feet of lumber in the forests of Pennsylvania, that is, approximately three and three-fourths cords of wood and 896 board feet of lumber on the average acre. Cords are converted into board feet by using 80 cubic feet per cord and 4.5 board feet per cubic foot as converting factors.

The area of forest land in Pennsylvania in 1922 and the wood present thereon is given in the following table, which divides the forest land into (1) farm woodlots; (2) State Forests; and (3) forest land outside of farm woodlots and State Forests:

	Area (Acres)	Volume On Average Acre (Cords)	Total Volume (Cords)
Farm Woodlots, ...	4,043,902	12.0	48,526,824
State Forests, ...	1,126,237	4.5	5,068,067
Outside of Farm Woodlots and State Forests, ...	7,854,260	3.5	27,489,910
	13,024,399	6.2	81,084,801

It is also estimated that by 1972 the forest area of Pennsylvania will have increased to approximately 14,000,000 acres and that the amount of wood on the average acre should be about 26.5 cords. This gives a total wood volume of 371,000,000 cords in the forests of the State, of which about 45% will be cordwood and 55% workwood (lumber). On the basis of this estimate there will be in the forests of Pennsylvania 73,458,000,000 board feet of lumber and 166,950,000 cords of wood. This estimate gives 5,247 board feet and 11.9 cords as the amount of wood on the average acre of forest land in the State in 1972.

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*The average acre of original forest left in 1860 contained more board feet than the average acre in 1600 and 1820, for most of the hardwood forest, which was stocked relatively light, had been cut-over and most of the heavily stocked white pine and hemlock stands still remained.

The estimated increase in the wood volume on the average acre of forest land in Pennsylvania during the next 50 years is given by decades in the following table:

Year	Amount Of Wood On Average Acre (Cords)
1922	6.2
1932	8.5
1942	12.5
1952	17.8
1962	23.0
1972	26.5

The above table shows that during the next fifty years the amount of wood on the average acre will increase from 6.2 cords to 26.5 cords—an increase of 20.3 cords on the average acre.

PRESENT VALUE (1922) OF PENNSYLVANIA'S FORESTS.

	Area (Acres)	Average Value Per Acre	Total Value
State Forests (January 1, 1922), ...	1,126,237	$10.88	$12,255,439.51
Farm Woodlots, ...	4,043,902	21.00	84,921,942.00
Other than State Forest and Farm Woodlots,	7,854,260	4.75	37,307,735.00
	13,024,399	$10.33	$134,485,116.51

This estimate of value is based upon an approximate land value of $2.00 per acre, $7.00 per thousand for lumber, and $0.50 per cord for fuel wood.

During the next fifty years the forests will not only increase in wood volume but also in equality and value. There will be a marked improvement in forest composition and forest conditions, and a big increase in forest values. An estimate of the value of the future forests of Pennsylvania follows:

ESTIMATED VALUE OF PENNSYLVANIA'S FORESTS (1972)

	LAND VALUE	
	14,000,000 acres @ 8.00, ...	$ 112,000,000
	WOOD VALUE	
a.	73,458,000,000 board feet @ $20.00 per M., ..	1,469,160,000
b.	166,950,000 cords @ $2.00 per cord, ...	333,900,000
		$1,915,060,000

On the basis of the above estimate the value of the average acre of forest will be approximately $137.00 in 1972.

In making estimates of forest values, it is important to consider the determinating factors that affect value. Unstocked or poorly tocked forest soil is valued at the local sale of unproductive forest soil. The introduction of forestry methods and practices transform unproductive into productive soil. The forest soil is changed from a passive to an active commodity. It is made revenue producing. By way of example, let us assume that a business enterprise sells stock at par, $100.00 per share, and pays 8% dividends. Business improves and the concern's output is enlarged. Financial conditions permit the company to raise the dividends to 12%. As a result, the stock sells for $150.00 per share. Capital value has been created by the increased earning capacity. The same increase in value occurs when barren—unproductive—forest land is made to produce a larger quantity and a better quality of forest products for which a constantly increasing demand exists.

LUMBER PRODUCTION AND CONSUMPTION IN PENNSYLVANIA.

In 1860 Pennsylvania stood first among the States of the Union in lumber production. Then she produced much more lumber than her people needed. She held a prominent place in the field of lumbering until about 1890 when she suddenly changed from a lumber exporting to lumber importing state. To-day more than 84% of the lumber and 74% of the pulp wood used in the State comes from without her borders. The following table shows the relation between lumber production and lumber consumption in Pennsylvania:

Year	Lumber Consumption (Board Feet)	Lumber Production (Board Feet)
1880	1,567,538,000	1,733,844,000
1890	1,992,787,000	2,113,267,000
1900	2,791,837,000	2,231,284,000
1910	3,242,342,000	1,241,199,000
1918	2,632,965,000	530,000,000
1919	2,694,526,350	630,471,000
1921	2,719,200,000	510,000,000*

* Estimated.

The per capita lumber production is a better indicator of the actual forest siuation than the total lumber production, for with the rapid decrease in lumber output, due to forest depletion, there has been a continuous increase of population. The per capita production of lumber in Pennsylvania during the past thirty years is shown in the following table:

Year	Total Lumber Production (Board Feet)	Per Capita Lumber Production (Board Feet)
1890	2,113,267,000	420
1900	2,321,284,000	387
1910	1,241,199,000	162
1918	530,000,000	63
1921	510.000,000	58

The low stage of lumber output in Pennsylvania has not yet been reached, but will come in about five years from now when virtually every acre of mature timber, excepting small scattered stands, will have been cut over. Then and thereafter, until the effects of adequate forest protection and good forest treatment make themselves felt in an increased forest, output, the painful effects of a timber shortage will be keenly felt.

The foregoing tables show that the people of Pennsylvania consume annually 309 board feet of lumber per capita, while the production of lumber is only 58 board feet. This indicates that our forests at the present time are supplying only 16% of the total lumber needs of our people. The present total cut of lumber in Pennsylvania is less than the amount consumed in the Pittsburgh district alone. The right way to rectify the present unbalanced relation between wood consumption and wood production in Pennsylvania is not to reduce consumption but to increase production. The reduction of wood consumption will work unnecessary hardships on industries and deprive homes of essential comforts, while an increase of wood production can be accomplished without a hardship or a big sacrifice on the part of anyone.

We cannot hope to get much relief for the wood situation from nearby states, for Pennsylvania is almost completely surrounded by wood-importing states. West Virginia is the only bordering wood-exporting state. The only nearby wood-exporting states are West Virginia, Virginia, North Carolina, and South Carolina. These four states are rapidly approaching the wood-importing stage. Their lumber surplus at present almost equals the lumber shortage in Pennsylvania. The annual surplus of these states is rapidly decreasing, and consequently the wood situation is serious, for in a few years the Pennsylvania deficit must be made up from more remote sources of supply. Our wood needs will continue to grow. Each year greater difficulty will be experienced in satisfying them. It is therefore, imperative that special efforts be put forth to increase the output of our forests. We have plenty of forest land. All that is necessary is to put the land to work and, in time, it will produce most of the forest products needed to meet our requirements.

GROWTH, YIELD, AND INCOME OF PENNSYLVANIA FORESTS

The growth of the forests of Pennsylvania is extremely subnormal. They are now producing only about one-tenth of the wood they can be made to turn out. If the forests are given proper protection and handled carefully, their growth will gradually increase, for forest land responds promptly to any conscious care that is given to it. The estimated annual growth per acre during the next fifty years is given in the following table by decades:

Decade	Average Annual Growth Per Acre (Cords)	Growth Per Acre During Decade (Cords)
1922—1932	0.25	2.5
1932—1942	0.50	5.0
1942—1952	0.75	7.5
1952—1962	0.90	9.0
1962—1972	1.00	10.0
	Total, ...	34.0 cords

Under proper care and treatment, the forest land of Pennsylvania will produce at least one cord per acre per year. This estimate is fully supported by numerous measurements of the growth of forest stands in Pennsylvania and within similar forest types in New England.

A yield of a cord per acre per year was secured on second cuttings of mixed hardwood stands on the Michaux and Mont Alto State Forests when charcoal furnaces were in operation. Recent growth studies show that middle-aged white oak stands in Huntingdon County are growing at the rate of 1.2 cords per acre per year. Dr. R. T. Fisher, Director of the Harvard Forest School, states that "it is safe to count on 35,000 board feet of saw timber to the acre at a rotation of 60 years in mixed pine (85%) and hardwoods". Prof. J. W. Toumey ("Seeding and Planting") writes that "a white pine plantation near Keene, N. H., planted in 1871, and measured in 1915, contained approximately 30,000 board feet of wood per acre". Near South Lancaster, Mass., is a plantation of white pine that is laying on wood at a rate of more than 1,000 board feet per acre per year. Another Massachusetts white pine plantation at the age of 60 years contained 400 trees to the acre, and yielded 41,000 board feet per acre. A 46-year old plantation of white pine located near West Monponsett, Mass., was cut a few years ago and yielded 30,000 board feet per acre. The site was an old farm abandoned shortly after the Civil War. The only care ever given to the tract was the removal of dead trees. Had the trees been spaced closer than 10 x 10 feet and been given better care, they would have grown taller and yielded more and better timber.

The Pennsylvania Department of Forestry estimate of forest growth—one cord per acre per year—is conservative compared with the growth of well-managed European forests upon which growth conditions are in many cases less favorable than in Pennsylvania. For example, a 60-year old plantation of American white pine in Germany is growing at the rate of 135.5 cubic feet (1-½ cords) per acre per year. The communal forests of Boveressee, Switzerland, produced 138 cubic feet per acre in 1892 and 146 cubic feet (almost 1-⅔ cords) in 1916. The average annual timber growth in Saxony is 93 cubic feet (more than one cord) per acre. The annual timber growth in the Sihlwald, Switzerland, is 124.6 cubic feet (more than 1-⅓ cords) per acre.

A plantation of Douglas fir, native to western North America, made a growth of 159 cubic feet per acre per year; another plantation made a mean annual growth of 274 cubic feet (3 cords) per year.

With a probable future forest yield in Pennsylvania of one cord (90 cubic feet) per acre per year, the average annual production in board feet and cords per acre at specified ages will be:

Age (Years)	Forest Yield Per Acre
50	270 board feet and ½ cord of wood.
75	350 board feet and ⅓ cord of wood.
100	405 board feet and ¼ cord of wood.

When the annual yield of one cord per acre is reached by 1972, then the forests of Pennsylvania will be yielding annually 14,000,000 cords of wood, or its equivalent, if other units of wood measure are used. It is ulta-conservative to predict that they will yield annually 10,000,00 cords of which 55% will be workwood (timber) and 45% fuel wood. This means that the forests of Pennsylvania, by 1972, will yield annually at least 2,400,000,000 board feet of lumber and 4,500,000 cords of wood. This estimated yield of lumber is greater than the largest annual output (2,321,284,000 board feet in 1900) of lumber in Pennsylvania during the big lumbering days.

What the income of the forests of Pennsylvania will be in fifty years from now is difficult to predict. Many variable factors influence the price of forest products. Stumpage prices have increased remarkably during the past thirty years, particularly during the past five years. The prices of some wood has increased 400%, and a few kinds of wood have increased as much as 500% in fifteen years. From the experience of foreign countries and the trend of prices of forest products and forest land values, it is absolutely safe to predict that in fifty years the net income from the forests of Pennsylvania will average at least $2.50 per acre per year, and it may reach $4.00. When restored to full production, the well-managed forests of the State will yield a net annual return of $6.00 to $7.00 per acre. This prediction is supported by financial data of the principal state forests and selected municipal forests of Europe. The gross and net income derived from these forests is shown in the following table:

INCOME PER ACRE FROM STATE FORESTS OF GERMANY.

Years	WURTTEMBERG (490,000 acres)		SAXONY (431,000 acres)		BAVARIA (2,330,000 acres)		PRUSSIA (6,796,000 acres)	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net
1830		$ 82		$1 10		$ 46		$ 44
1850-59	3 60	2 11	3 03	1 94			91	54
1860-69	4 73	2 89	4 46	3 21	2 32	1 35	1 46	83
1870-79	5 77	3 45	5 76	3 92	2 95	1 66	1 96	97
1880-89	4 99	2 70	6 47	4 33	2 64	1 30	2 20	1 01
1890-99	6 35	3 87	7 13	4 50	3 73	1 81	2 68	1 29
1905	9 20	6 10	8 44	5 39	4 55	2 00	4 26	2 42
1906	10 05	6 78	8 28	5 08	4 95	2 55	4 27	2 27
1907	10 90	7 47	9 60	6 17	4 90	2 55	4 54	2 51
1908	10 00	6 50	9 22	5 58	5 50	2 95	4 45	2 21
1909	9 90	6 35	8 96	5 24	6 80	3 30	4 53	2 02
1910			9 15	5 36			4 42	1 98
1911			9 20	6 03			5 19	2 92

In about sixty years the net income of the city forest of Chur. Switzerland, has increased nearly fivefold, and the famous Sihlwald. belonging to the city of Zurich, also in Switzerland, in now yielding as much as $12.00 per acre per year. The increase in net income per acre from the Chur forest is shown in the following table:

Period	Net Return Per Acre
1857—1866	$1.40
1867—1876	2.40
1877—1886	3.15
1887—1896	3.90
1897—1906	4.40
1907—1916	6.00

The foregoing estimates of yield and income may seem high, but we must remember that our eyes are continuously confronted by pictures of scrub oak, fire cherry, fire-scarred stumps, dead snags, and waste places which produce little or no wood value. We do not fully comprehend the yield possibilities of our forest land. Reliable financial calculations show that the forests of Saxony have not only paid 3% continuously in revenue, but have appreciated in value 24% by mere accumulation of material and increase in productive capacity. If we give proper care and treatment to the forests of Pennsylvania we, too, will get a high net yield, and it will not take us so long to reach the goal as it took in Europe.

CONCLUSIONS.

(1) The original forest of Pennsylvania covered at least 28,650,000 acres. The forest area of the State reached its minimum about 1900, when there were approxjmately 12,000,000 acres of forest land in the State. There are now (1922) 13,024,399 acres of forest land in the State—an increase of more than 1,000,000 acres in the last 22 years. Abandonment of mountain farms and other clearings is responsible for this big increase. It seems fair to estimate that the forest acreage will increase to approximately 14,000,000 acres by 1972. Thereafter the forest acreage is not likely to change 2 per cent in 100 years.

(2) The average acre in the original forest carried approximately 17,500 board feet of lumber and 10 cords of wood. This estimate gives a total of 501,375,000,000 board feet of lumber and 286,500,000 cords of wood in the original forest. The amount of wood in the forests of Pennsylvania has been reduced until now there remain only 11,676,211,200 board feet of lumber and 48,650,881 cords of wood, which is equivalent to about 6.2 cords on the average acre. This shows that there remains now about 1/25 of the lumber and 1/6 of the cordwood that was present in the original forest.

Of the 81,084,801 cords of lumber and wood now present in the forests of Pennsylvania, 48,526,824 cords are in the farm woodlots, 5,068,067 cords in State Forests, and the remaining 27,489,910 cords are in forests outside of the farm woodlots and the State Forests. This means that 12 cords of wood are on the average acre of farm woodlot, 4.5 cords on the average acre of State Forest land, and 3.5 cords per acre on the remainder of forest land.

By 1972 the wood in the forests of Pennsylvania should increase to 73,458,000,000 board feet and 166,950,000 cords of wood. This is equivalent to 26.5 cords per average acre, and represents an increase of 20.27 cords over that present in 1922.

(3) The present value of the forests of Pennsylvania is $134,485,116.51. This represents an average value of $10.33 per acre. A classification of the value of the forests of the State gives the State Forests an average value of $10.88 per acre, the farm woodlots are rated at $21.00 per acre, and the remainder of forest land at $4.75 per acre.

(4) During the next 50 years the forests of Pennsylvania, if given proper care and treatment, will not only increase in *volume*, but also in *quality* and *value*. The estimated value of the forest

of the State in 1972 is $1,915,060,000—an increase in value of more than $1,780,000,000. This estimated value for 1972 represents an average of $136.78 per acre, as against a present value of $10.33.

(5) In 1800 Pennsylvania stood first among the United States in lumber production. Now she holds twentieth place. In 1890 she suddenly changed from a lumber-exporting to a lumber-importing State. Now more than 84% of the lumber and 74% of the pulpwood used within the State is imported from beyond her borders. The lumber consumption has almost doubled in the last 40 years while the lumber production is less than one-fourth of what it was 20 years ago. The per capita production of lumber has decreased from 420 board feet in 1890 to 58 board feet in 1921.

(6) The low stage of lumber output in Pennsylvania has not yet been reached. It will come in about 5 years from now. The people of Pennsylvania consume annually 309 board feet per capita while the production of lumber within the State is only 58 board feet per capita. This shows that the forests of the State are supplying only 16% of the total lumber needs of the people.

(7) Our wood needs will continue to grow. Neighboring states cannot help much longer to relieve the lumber shortage. It is imperative that special efforts be put forth to increase the output of our own forest land. We have plenty of it. All that is necessary is to put the forest land to work, and there will, in time, be produced enough wood to satisfy the major needs of our people.

(8) Because of existing forest conditions in Pennsylvania, the forest growth is extremely subnormal. The forests are now producing only about one-tenth of the wood they can be made to turn out. If given proper protection and treatment, the forest growth will be increased threefold during the next 15 years, and by 1972 the average annual production will have been increased from one-tenth of a cord to a full cord per acre per year.

(9) If the annual yield of one cord per acre per year is reached by 1972, then the forests of Pennsylvania will yield annually 14,000,000 cords of wood. It is ultra-conservative to predict that they will yield 10,000,000 cords, of which 55% will be workwood (timber) and 45% fuel wood. This means that the forests of Pensylvania by 1972 will yield at least 2,400,000,000 board feet of lumber and 4,500,000 cords of wood. This output will be greater than the cut of the banner year 1900 (2,321,284,000 board feet), which stands out so prominently in the great lumbering days in Pennsylvania.

(10) What the income of the forests of Pennsylvania will be in 50 years is difficult to predict, but European experiences, and the trend of economic determining factors, indicate that the net income will be at least $2.50 per acre per year and it may reach $4.00. When restored to full production, the well-managed forests of the State will yield a net annual return of $6.00 to $7.00 per acre.

(11) Our eyes are almost continuously confronted with pictures of inferior forests. This causes us to under-estimate the possibilities of well-stocked and active forests. Reliable financial calculations show that well-managed forests of Europe have not only paid 3% continuously in revenue but at the same time have appreciated in value 24% by mere accumulation of material and increased productive capacity. There exist no reasons why our forests cannot do equally well or better.

(12) All the good that flows forth from forests is not measurable in the form of wood volume or monetary income. The intangible value of forests is often overlooked or underated. Some of the more important indirect benefits of forests follow:

a. Forests form, fix, and improve the soil. The richness of the virgin soil is proverbial. Vast areas of fertile land consist almost entirely of the detritus of the forest. One of the most important functions of the forest is the fixation of the soil. The roots of forest trees clasp and hold the soil in place, and the mulch on the forest floor protects it to such an extent that wind and water erosion are prevented. The destructive work of the waters of Lake Erie have been checked along the banks of Presque Isle by the planting of forest trees. The extent to which trees hold the soil along the banks of streams and on steep slopes, thus 'preventing the washing away of the soil, is enormous.

b. Forests feed springs. All the world knows that the forest cover is a great help in the maintenance and conservation of springs. In mountain regions where the forests prevail springs are most numerous. We are justified in repeating, as our forefathers declared. "The forest is the mother of the rivers."

c. Forests reduce the run-off of "wild waters". There is much less run-off in forested than in denuded regions. Extensive damage from floods occur less frequently in streams coming from the forests than from poorly forested and treeless watersheds.. In deforested regions the difference between the low water mark and the flood stage is formidable. The forest cover acts as a regulator of the stream flow. It tends to decrease the high water run-off in spring and other flood periods, and increases the low water run-off in summer and prolonged dry periods. The regularity of the run-off of streams is determined by the condition and extent of the forest cover on the drainage basin. The presence of forests checks the formation of torrents, while the absence of forest cover exposes the soil to the ravages of erosion.

On October 6—8, 1922, the Susquehanna River was only 0.6 of a foot above the bed or base rock—the lowest stage in 22 years. The water supply situation for home consumption and industrial uses was becoming serious, when a welcome and generous rainfall occurred. It would have been less serious if a normal forest cover had been present on the forest land about the river's headwaters.

In the spring of 1920 the Susquehanna River reached the flood stage. Many small towns were under water. bridges were washed away, railroad transportation crippled. and business was locally paralyzed.

The direct loss to the city of Pittsburgh from the great flood of 1907 reached the stupendous sum of $5,259,500. Nearly 1,600 acres of the city were under water. The assessed valuation of real estate affected by the flood amounted to about $160,000,000. Real estate experts estimate that the properties in the flood range are nearly $50,000,000 lower in value than they would be if the flood danger were eliminated.

The damage that floods have done in Pennsylvania would pay for the complete reforestation of all the idle acres within the State. The old truism still holds that "He who wishes to master the waters must first master the forests."

d. Forested mountains change an unruly water into a useful one Where there are no forests heavy rainfalls become raging torrent Much water is squandered which implies a marked decrease i water power, which is annually becoming more essential to indu trial enterprise. The forests can stop this frightful loss of wate and make it available for industrial use. We need a complet forest cover on our hillsides to insure a dependable water flow fo the waterfalls that direct the turbines and produce power for ligh heat, and industrial uses.

e. Stagnant and polluted water is rare in the forest. The mos potable water comes from forested watersheds. The purity of suc water helps maintain the healthfulness of millions of people who li in the cities.

f. The forests are health resorts. In affording a place whe busy brains and tired bodies may find rest, diversion, pure wate and fresh air, the forest performs a beneficial service of inestimab value to mankind. History proves that when a nation loses i forests it also loses its virility. There is no place more favorab to the maintaining and regaining of health than the forest. It there that life is simple and pure.

g. There is no better place to play and rest than in a forest e vironment. The forest is the most ancient of human dwelling plac How highly recreation in the forest is treasured is reflected in t sacrifices men make and the money they spend for a few days in t woods. Upwards of 450,000 resident hunters' licenses are being issu annually in Pennsylvania, and almost half as many fisherman se recreation in the great out-of-doors. It is estimated that duri 1921 at least 80,000 people enjoyed camping privileges on the St Forests of Pennsylvania. The play instinct finds its best and high development in a forest environment.

h. Forests adorn the earth. A land dotted with beautiful fore is an enchantment to the eyes. A treeless land is as cheerless a creedless land is hopeless. The ideal land is one in which well-k forests cover the hillsides and dot the lowlands, and fertile fie abound in the valleys.

(13) Forests are an index of public welfare. Their products indispensable to human progress; their wood and food, their sh and shelter, and their many other products are among our grea needs. We can have an abundance of all these essential and b ficent forest gifts if we regard the forest as a heritage given t by nature, not for spoil or to devastate, but to be widely used, erently honored, and carefully maintained.

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